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REPORT

ON

INDUSTRIAL EDUCATION.

PART I.

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REPORT

ON

INDUSTRIAL EDUCATION.

PART I.

REPORT

ON

INDUSTRIAL EDUCATION.

BY

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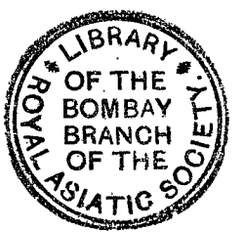

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PART II.

PROCEEDINGS OF CONFERENCES WITH LOCAL OFFICERS.

SUMMARY OF RECOMMENDATIONS MADE BY THE COMMITTEE.

IMPERIAL.

1. That an officer be appointed to be Director of Industries and Industrial Instruction under the Government of India. (Paragraph 49, page 16.)

2. That a Survey of Indian Industries be made. (Paragraph 58, page 18.)

3. That six Institutes of Industrial Experiment and Instruction be opened under the direction of the Director of Industries, at an approximate capital and annual cost of Rs. 3,30,000 and Rs. 1,87,000, respectively. (Paragraph 33, page 11, and pages 19 to 23.)

4. That scientific research in the nature of certain Economic Products be initiated at an annual cost of about Rs. 25,000. (Paragraph 33, page 11, and page 23.)

5. That Taccavi Advances be granted by Government to artisans who have been registered as being fit to train apprentices. (Paragraph 26, ii, page 9.)

6. That the law and rules regulating the Indenturing of Apprentices be revised in order to facilitate their application. (Paragraph 21, iii, page 7.)

7. That Government Factories and Workshops be maintained in a state of efficiency at least superior to that of similar Private Factories. (Paragraph 22, page 8.)

8. That Registered Factories be placed on a list of firms entitled to receive Government orders. (Paragraph 23, i, page 8.)

9. That committees of heads of workshops be appointed to prescribe Tests of Industrial Skill in each craft. (Paragraphs 21, iv and 25, pages 7 and 9.)

10. That private individuals be encouraged to start New Industries, which have been proved in the Institutes of Industrial Experiment to be financially suitable to local circumstances, by the guarantee, for a limited period, of interest on the capital they invest in the industry. (Paragraph 35, iii, page 11.)

11. That the Manager of such Institutes should receive a monetary reward whenever a new manufacture is initiated through his exertions. (Paragraph 35, page 11.)

PROVINCIAL.

12. That the Provincial Departments of Public Instruction be relieved of the control of Industrial Instruction. (Paragraph 49, page 16.)

13. That the Provincial Chief Inspector of Factories be entrusted with the development of Industrial Instruction in each Province. (Paragraph 52, page 16.)

14. That persons highly skilled in each of the Principal Industries of the Province and having adequate literary training be appointed to be Instructors in Industries and Inspectors of Industrial Instruction under the Chief Inspector of Factories. (Paragraph 55, page 17.)

15. That Instructors and Inspectors be trained in the Institutes of Industrial Experiment and in existing Engineering and Art colleges and schools. (Paragraphs 36, page 11, and 38, page 12.)

16. That a system of Apprenticeship in workshops be relied on for training artisans in preference to a system of class instruction in schools. (Paragraph 15, page 5.)

17. That the moral welfare of apprentices be provided for by opening Hostels for them in industrial centres. (Paragraph 21 vi, page 8.)

18. That selected factories and workshops be registered as being suitable for the instruction of apprentices. (Paragraph 21 i, page 7.)

19. That the recruitment of apprentices for registered factories with an elementary knowledge of the "3 Rs" be facilitated. (Paragraph 21 i, page 7.)

That foremen, chargemen, and craftsmen be given—

20. rewards in cash, (Paragraphs 21, v and 26, i, pages 8 and 9.)

21. honorific posts as heads of the caste group or trade guild, (Paragraph 26 iii.)

22. expert advice free, (Paragraph 26, iv.)

23. patterns and designs free, (Paragraph 26, v.)

24. improved tools at cost price, (Paragraph 26, vi.)

—when the apprentices trained by them pass the tests of industrial skill.

25. That articles of exceptional merit made by them be purchased for Museums. (Paragraph 26, vii)

26. That they be assisted in the sale of their goods by private associations for the encouragement of industries. (Paragraph 26, viii.)

27. That apprentices be permitted to offer themselves for examination in the prescribed tests. (Paragraph 27, page 9.)

That apprentices be encouraged—

28. by the grant of small stipends or gifts of tools for exceptionally good work in test examinations, (Paragraph 27, i.)

29. by the grant of certificates for each test passed, (Paragraph 27, ii.)

30. by facilitating their admission to factories as apprentices. (Paragraph 27 iii.)

31. That eventually registered craftsmen be induced to bring their workshops within one set of buildings as in the Casanova Institution in Naples in order that the moral and physical welfare of their apprentices may be watched over by a Superintendent. (Paragraph 30, page 10.)

32. That the training of craftsmen be modernized and improved by employing them in the Institutes of Industrial Experiment. (Paragraph 35, i, page 11.)

33. That jails be utilized as institutions for experiment in hand industries. (Paragraph 34, page 11.)

34. That the organization of trade guilds be encouraged. (Paragraph 28, page 10.)

35. That the adoption, by guilds, of trade marks be encouraged. (Paragraph 29, page 10.)

36. That Local Committees of persons in a trade or especially interested in industrial work be formed for assisting the Provincial Chief Inspector of Factories with their advice. (Paragraph 56, page 18.)

37. That the influence of guilds and trade caste panchayets be utilized when dealing with craftsmen. (Paragraph 57, page 18.)

38. That Classes or "Night" Schools for the instruction of artisans, at hours when they are not engaged in work, be opened in industrial centres. (Paragraph 44, page 13.)

39. That instruction be given in these classes in subjects which are to be settled in consultation with the employers of the artisans. (Paragraph 45, page 14.)

40. That instruction in drawing and designing be provided for in these classes. (Paragraph 46, page 14.)

41. That the number of skilled craftsmen in the workshops of existing industrial schools be increased to not less than one for every five pupils. (Paragraph 48, pages 14 to 16.)

42. That in such workshops articles be made for sale.

43. That it should be an aim of such institutions to make a profit.

44. That Government should not maintain institutions of this nature. (Paragraph 11, page 3.)

45. That building and equipment grants should be given to private institutions of this nature. (Paragraph 43, page 13.)

46. That classes in which manual training is given, and are not intended to impart a knowledge of a particular trade, should be regarded as portions of schools of general education; they should be under the Educational Department and be eligible for grants-in-aid. (Paragraph 40, page 12.)

47. That private individuals should be encouraged to open factories in connection with schools in which manual training is given in order to secure as apprentices the pupils of such institutions. (Paragraph 42, page 13.)

REPORT OF THE COMMITTEE ON INDUSTRIAL EDUCATION.

INTRODUCTION.

The Scope of the enquiry.

In carrying out the enquiry of which the results are given in this Report we have taken Industrial Education to exclude—

(1) Instruction in Fine Arts,

(2) Technical instruction other than that required by artisans and foremen,

(3) Agricultural Education,

and have restricted the scope of our investigation to such instruction of artisans and foremen as may be required by them irrespective of general education (with which we would include "manual training"). These limits appear to us to indicate the proper scope of Industrial instruction as defined at the Educational Conference held in Simla.

The Work of the Committee.

2. A list of the places and institutions visited will be found in Appendix I. The proceedings of the Conferences held are given in Part II of this Report. The opinions expressed at these Conferences have been briefly summarized in Appendix II.

CHAPTER I.

PRESENT POSITION OF INDUSTRIAL INSTRUCTION AND COMMENTS ON EXISTING SCHOOLS.

Systems of industrial tuition.

3. Instruction may be imparted in Industrial Schools on one of two systems, or by a combination of both. These may be called the class-system and the apprentice-system.

The class-system.

4. The first involves a teacher, skilled in the craft to be taught, who causes a number of pupils to execute exercises; the teacher himself does not handle the tools, except in so far as this may be necessary for purposes of demonstration. In some cases the pupils are set to make articles after the termination of the course of exercises; each pupil makes a complete article, the difficult as well as the easy portions; the choice of the article is therefore determined by the amount of skill he possesses, not by the demand in the market. The teacher is able to direct and supervise a considerable number of pupils, often as many as twenty; he receives a fixed salary and has no financial stake in the school. The pupils are usually induced to attend the class by the prospect of receiving fixed monthly stipends and free literary training, or by being paid from the school funds. The school supplies materials and tools and receives any profit that may accrue from the sale of articles. The aim of the school is to teach boys to use tools skilfully.

The apprentice-system.

5. The apprentice-system of teaching is that which obtains in every trade workshop. The skilled worker, or craftsman, executes various pieces of work, he is assisted by learners, or apprentices possessed of different grades of skill, who do the easy portions of the work and at the same time learn the craft. The nature of the work done is determined by the market demand. The number of apprentices whom the skilled worker may profitably employ is determined by the nature of the craft. It is generally small, two or three being the usual limit. The craftsman makes a living by his work and pays for the tools and materials. The apprentices receive from him a small wage which varies with their skill. Beginners are not paid. The aim of the trade workshop is to make a profit.

The Casanova Institution.

6. The latter is the system of instruction adopted in the Casanova Institution in Naples. The pupils are apprentices in private workshops; they receive wages as soon as their work becomes of value to the master craftsman, to whom the shop belongs. In return for rent-free buildings, and free expert advice, the master craftsman submits to a number of restrictions, framed with a view to the moral education of the pupil. To facilitate supervision a number of master craftsmen are brought together within one group of buildings. The great success of this institution in creating skilful, intelligent, industrious artisans is proof of the suitability of the methods adopted.

The Industrial Schools of India.

7. A list of schools compiled from the information supplied to us will be found in Appendix III. The following is a summary of the leading features of the schools in each province :—

Bengal—

In Bengal one school and a number of classes aim at teaching a trade to boys by the class-system. The teaching is seldom superior to that which a boy of the artisan class can obtain by apprenticing himself to a craftsman. The high cost is somewhat reduced by a partial adoption of the apprentice-system inasmuch as orders for work are generally accepted and are executed by the teacher with the assistance of the pupils. Boys of the non-artisan classes, who have no intention of working at the craft they learn, have frequently been attracted by fixed monthly stipends.

A sericulture school for adult silk-worm rearers and a weaving class for adult weavers are disseminating improved methods with efficiency and economy.

There are unaided schools managed by private bodies, about which very little information is available.

North-Western Provinces—

In the North-Western Provinces, in one Government school, craft instruction is being given on the class-system. Literary training was formerly given, and this attracted boys who had no intention of earning a living by the craft they learnt. This literary training has now been discontinued. A new institution, where the apprentice-system will be adopted and where the general arrangement will be similar to that of the Casanova Institution at Naples, is being established in Lucknow.

There are also aided and unaided institutions managed by private bodies, mostly conducted on the apprentice-system.

Punjab—

In the Punjab one school supported by Government aims at training artisans for the Lahore Railway Workshops. The school has largely failed to realize this aim. Industrial instruction is imparted on the class-system.

A number of schools supported by public and private funds are aided with grants based on industrial tests. They are very moderately successful in training artisans. In all these schools much time is spent in literary work. The industrial training mainly consists in working through exercises; much attention is given to artistic work. It is proposed to greatly reduce the amount of literary training given.

Attached to the Lahore School of Art there are classes in art industries; they are successful. The class-method obtains.

The moderate success attained by the Punjab schools appears to us to be due to the natural bent of the *Punjabi* towards an industrial life, rather than to the suitability of the methods adopted. The schools are generally very costly.

Central Provinces—

In the Central Provinces there are no Government schools. A number of private schools are aided with grants based on industrial tests. The method adopted is, as in Bengal, a combination of the class with the apprentice-system.

Bombay—

In Bombay there are a number of schools supported by Government in which the class-method, limited to exercises, is in use. In a number of private aided schools a combination of the class and apprentice methods has been adopted, and articles are made for the market as in Bengal. Aid is granted on an inspection of a prescribed set of exercises performed by the pupil. Some of these latter schools, supported by missionary bodies, attain considerable success in creating artisans for whom in some cases employment is found in small

factories attached to, but managed separately from, the schools. As at Lahore, classes in industrial art are attached to the School of Art. A modified class-method has been adopted.

Madras—

In Madras there are a number of schools supported by public and private bodies and aided with grants based on industrial tests. Instruction is mainly given by the apprentice-method. Work is made for the market.

As at Lahore, classes in industrial art are attached to the School of Art.

The School of Art has a department which manufactures aluminium-ware for the market. It is not an industrial school but an institute for experiment in industrial methods, in which the experimental stage is approaching completion.

Burma—There are no industrial schools in Burma.

Inefficiency of the class-system.

8. It has been shown above that the existing schools have largely adopted the system of class-instruction. By this method the pupil is not brought into contact with the trade and the market, he lacks training in economy of production and business habits, and his commercial instincts remain undeveloped. It is unfortunate that registers showing the occupations followed by former pupils of the schools have not been maintained. This should be done in the future. The evidence obtained tends to prove that only a small proportion of the pupils become artisans, the majority endeavouring to obtain less laborious employment for which they are unfit and for which a more efficient and less costly training is available elsewhere.

The cost of the schools is excessive.

9. There is a large unremunerative consumption of material in the exercises and on the various articles manufactured; these being often beyond the skill of the pupils are badly made and possess no saleable value. Moreover the failure to utilize the skill of the teacher in the work done adds greatly to the cost of the school. Owing to the absence of accurate records it is impossible to arrive at an estimate of the average yearly cost of training an artisan, but the figures in Appendix III seem to prove that each pupil costs almost R60 yearly. The majority do not become artisans. The average cost of each artisan is therefore very great.

Waste of teacher's time

10. Part of the teacher's time is occupied with the accounts inseparable from the control of commercial transactions, and is thereby lost to the pupil. The teacher is not interested in the financial success of the school and fails to secure due economy in time and material.

Condemnation of the class-system.

11. The class-system is therefore generally inefficient, costly, and unsuited to institutions supported out of public funds. The authorities consulted were generally of the opinion that the existing schools have been unsuccessful. With the exception of the Director of Public Instruction of the Punjab and of Dr. Thomson, Principal of the Poona College of Science, they were in favour of the apprentice-system of training.

We are inclined to think that the former may have been influenced in his views by the special disposition to adopt an artisan career, which is a characteristic of the people of the Punjab, and which has rendered the Punjab schools less unsuccessful than those of other provinces. We note that the Director of Public Instruction, Bombay, disagreed with Dr. Thompson's views on this point.

Some defects of existing schools.

12. Some additional defects of the existing schools are—

(i) Lack of definite aim.

(ii) Training in subjects not required for the particular trade aimed at, such as, unsuitable literary subjects, carpentry for a carpet-maker, surveying for a fitter.

(iii) Insufficient specialization of course of instruction.

(iv) Insufficient attention to hereditary talent or suitability of pupils for an industrial life.

(v) Liberal stipends and literary instruction as an attraction to pupils.

(vi) Inferiority of instructors and wrong methods of instruction.

(vii) Lack of consultation between school managers and the trade.

CHAPTER II.

THE PROPOSALS MADE AT THE CONFERENCES AND THE COMMENTS OF THE COMMITTEE.

General proposals.

13. The reduction of general education, provision for increased inspection, and the introduction of improved appliances were generally admitted to be both necessary and desirable.

Detailed proposals.

14. The proposals made for carrying out the resolutions of the Educational Conference can be summarized as follows:—

Bengal—

Serampore	A peripatetic Weaving School (weavers to be trained to become instructors of their fellow weavers).
Calcutta	A school for metal-work, basket-work, and weaving.
Dacca	„ for textiles, ivory, and silver-work.
Patna	„ for glass, weaving, and pottery.
Cuttack	„ for mat and cane-work, silver-work, and weaving.

The Bengal Government subsequently forwarded a scheme drawn up by the Director of Public Instruction which contemplated action in three directions—

(*a*) Industrial research;
(*b*) Instruction in the results of such research;
(*c*) Instruction in processes at present followed by the best native craftsmen.

Definite proposals have been prepared only in reference to (*c*). Briefly, the instruction is to be imparted by the craftsman in his shop to 20 pupils, receiving monthly stipends of ₹2, the craftsman to be rewarded by the use of the pupils' services. Drawing is to be taught by a Government Instructor on ₹20 to ₹30 per mensem. When required, an Instructor is to be provided to teach the theory of the craft on the same pay. Control is to be exercised by local executive and educational officers.

North-West Provinces—

It was proposed to establish a special Boarding and Day School for European and Eurasian boys at Cawnpore.* His Honor did not wish that further Industrial Schools should be established until the result of the experiment at Lucknow mentioned in paragraph 7, was known.

Punjab—

The schools proposed were:—

Lahore	for Pottery and glazing, glass and silk-weaving.
Hoshiarpur	„ Ivory inlay and wood-work.
Multan	„ Pottery.
Bhera	„ Cutlery and jade-stone work.
Sialkote	„ Damascening.
Wazirabad	„ Cutlery.
Pathankote	„ Bamboo furniture.
Jullundur	„ Wood-carving and turning.
Chiniot	„ Wood and brass-work.
Peshawar	„ Pottery and wax embroidery on cloth.
Delhi	„ Ivory-carving and jewellery.
Ludhiana	„ Cotton-weaving.
Kangra	„ Silver-work.

Priority was to be given to those at Multan, Sialkot, Wazirabad, and Ludhiana.

Central Provinces—

It was stated that research should first be made into possible improvements in weaving and sericulture, and that the results might be taught in schools to be started—

(*i*) for weaving at Umrer and Nagpur,
(*ii*) for sericulture at Chanda and Sambalpur.

Schools on the Casanova System were also proposed for carpentry and blacksmith's work at Jubbulpore and Nagpur.

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* A detailed scheme for this school, including estimates, has been drawn up by the President at the request of His Honor the Lieutenant-Governor of the North-West Provinces, *vide* Appendix No. IV.

Bombay—

Normal classes at Bombay and Poona, to be followed by an Industrial School in each Revenue Division and Sindh were proposed.

Madras—

It was not proposed to start any schools until final orders have been passed on the experiment at present being carried out in the Aluminium Department of the Art School.

Burma—Proposals were confined to a system of control of apprentices.

15. Too much prominence cannot, we feel, be given to the very general admission of the majority of officials and non-officials questioned on the point concerning the difficulty of producing a workman capable of earning his living in a school conducted on the class-system. We are not aware of any general attempt in any other country but India to impart industrial skill in the same way as literary knowledge; nor do we believe that any such system can eventually result in the production of artisans unless it be at a prohibitive cost; instruction to artisans *in the methods of work at present in use* can be more satisfactorily imparted by the apprentice-system. Such a system already exists for this purpose, and the need for schools can only arise when it is intended to offer instruction to pupils in improved processes, in the use of superior implements, or in new industries. This is in harmony with the resolutions of the Educational Conference. In other words, the need for schools does not exist (except in the special case of those to whom the channels of apprenticeship are closed), when present methods are to be taught. *For instruction in known methods, schools are not required.*

It is only in Burma and in Bengal that specific proposals have been made for controlling education on the apprentice-system. In paragraphs 21 to 30 recommendations will be found for systematizing and directing the present methods of apprentice instruction in factories and native workshops.

16. Passing to *instruction in improved processes, in the use of superior implements, or in new industries* we note that only in Bengal, the Central Provinces, Bombay, and Madras has adequate recognition been given to the fact that, before instruction can be imparted, the Instructors in most cases must first acquire a knowledge of superior methods and appliances suitable to the requirements of the country. Selected trades have been specified in each province instruction in which should be given in schools, but it seems to us that no good purpose could be served by endeavouring to impart such instruction unless previous systematic arrangements be made with a view to— *For instruction in new methods, experiment and training of instructors must precede attempts to teach.*

(i) proving by experiment the value of the improved methods and appliances in the use of which it is proposed to give instruction,

(ii) training the Instructors who are to impart such instruction.

It will be seen that in many instances the results of such experiment may be disseminated without incurring expense for schools.

In no case have we been supplied with any definite scheme for the systematic institution of Industrial experiment. We have attempted to supply this defect in the proposals which will be found in paragraphs 31 to 35.

17. Apart from these general observations some of the proposals made at the Conferences seem to us open to the following criticisms :— *Detailed examination of the proposals made at the Conferences.*

Bengal—

It is very doubtful whether craftsmen will be found willing to accept Mr. Pedler's proposed terms. If this can be done, the scheme should certainly be tried, but with not more than five pupils to a craftsman, and it should be possible for one Drawing Master to take charge of several shops. We do not approve of the proposal to pay stipends to the pupils, payment of wages by the craftsman being preferable.

Punjab—

The proposal made for starting a school at Kotli near Sialkot to teach damascening may be modified, as no instruction seems to be required by the workers in so far as the process of damascening is concerned. A training in design and in suitable models is necessary, as the art is decaying owing to the workers' ignorance of suitable forms on which to display their work. A Drawing and Design School should, therefore, be opened with a Drawing Master as Superintendent.

Central Provinces—

It would be better to arrange for training carpenters and iron-workers in the Gun Carriage Factory at Jabbalpore and the Railway Workshops at Nagpur in the manner described in paragraph 21 than to open schools for this purpose. Regarding sericulture and weaving, proposals are made in paragraph 33.

Bombay—

The proposed normal schools would be best established in the manner suggested in paragraphs 36 to 38.

Madras—

The aluminium experiment at the School of Art has made great progress. As it was decided by Government not to take steps for the establishment of further schools until final orders were received on this subject, it seems necessary to make a few remarks on the results of the scheme. (See paragraph 18.)

Burma—

We think that experiments should be made in the apprenticeship-system, as recommended by His Honor the Lieutenant-Governor, on the lines laid down in paragraphs 21 to 30. A note by the President on the special conditions which obtain in Burma will be found on page 26.

The manufacture of aluminium ware in the Madras School of Art.

18. The manufacture of aluminium was undertaken with a view to proving that it could be made a financial success in this country. After three and a half years it seems that the financial results are as follows. If the capital employed in the venture had been borrowed at 6 per cent. there would have been a loss. If, on the other hand, the capital had been raised by floating a Company, the profits made would scarcely have paid 4 per cent. on the shares. (See note by Mr. Chatterton on this subject. Appendix V.) It is not therefore clear that the undertaking would so far have been found profitable by a private individual or a public Company: but it must not be forgotten that many financial sacrifices have been made in the course of the venture with a view to assisting the nascent industry: sacrifices which business men working for their own profit would not have made. Companies are now arising to exploit the new industry. It seems therefore necessary to fix a date by which the School of Art's experiment should be brought to a conclusion, and it would also be desirable to prove before such date that the enterprise is a profitable one when worked as by private capital.

If after that date it is thought advisable to maintain a restricted production of aluminium at the Art School for the purpose of giving instruction to metal workers, it might be possible to manufacture only articles for the use of Government Departments; but we are more in favour of the experiment being concluded on the date to be fixed, and further investigation being undertaken in the improvements possible in the manufacture of other metals, in accordance with the scheme for an Experimental Institute in Metal-work which will be found on page 21.

CHAPTER III.

THE PROPOSALS OF THE COMMITTEE.

A.—Instruction in Known Methods.

Apprenticeship.

19. It will have been seen in paragraph 11 that the authorities consulted generally recognized that the apprenticeship system offers a more satisfactory training in methods of work at present in use than can be gained by a process of class instruction. Every workshop, mill, and craftsman's shop maintains as an integral part of its business an apprenticeship-system often imperfect yet capable at least of producing workmen who can earn a living. The apprentice joins the shop without payment of a fee or proof of literary or other qualifications; he or his relations usually make a small present to the craftsman or foreman, and in some native trades a religious ceremony is said to take place; for some time he is expected to perform the menial duties of the shop and is put to work on the simplest class of operation in the trade; he receives no regular pay, but is usually allowed enough for his subsistence. As soon as he can do useful work it is the practice to grant him pay on a rising scale. His opportunities for learning his trade depend in large shops on the foreman,

In small work-shops, under a craftsman, or in large shops, under a contract chargeman, he has a better chance of making progress since his efficiency increases his own as well as his master's profits. In time, by constant practice, he attains some degree of efficiency according to his ability and opportunities. At this stage, he either goes out into the world as a workman, or he secures a place on the permanent roll of the shop. If the head of the shop or firm takes an interest in the pupil, his chances of success are greatly increased. In large workshops he is sometimes put on probation for months in order to test his fitness and character, he is then indentured, given the advantage of a voluntary night school, and granted a certificate when he has proved his efficiency. These advantages are, however, rarely available for workmen who are not likely to rise to higher posts, being intended more for the pupil likely to become chargeman by a system of natural selection. Drawing is frequently taught in native trades.

Defects of apprenticeship.

20. The defects which must exist in a system of instruction dependent on the discretion of managers of workshops, and frequently left in the hands of foremen or artisans, will be readily perceived. Apart from the varied standards of efficiency that will be aimed at, standards largely dependent on the skill of the instructor and the interest taken by him in his pupil, it is often the custom to confer the benefits of an apprenticeship only on those who are relations of the firm or of the employés. It may be difficult to deny that such persons have a prior claim to be trained, but if the existing supply of workmen is to increase and their skill is to improve with the demand for better work, means must be found for recruiting an additional supply of suitable pupils and for assuring them a training constantly increasing in efficiency.

Instruction in factories and large workshops.

21. The most suitable measure for remedying these defects and for securing a thoroughly efficient training of apprentices in factories and workshops seems to be Government control with a view to testing the efficiency of the apprentices and increasing their number. This control would be directed towards securing—

(i) *The recruitment of pupils.*—

It is evident that preliminary education of a simple nature is advantageous if it can be secured without injury to the prospects of the pupil in his trade, and without incurring the danger of over-educating men who have to earn their living by the practice of a handicraft. Much evidence has been given to shew that workmen educated far above the average of their class become unfitted for work, discontented, and give trouble to the foreman and the management. It should however be possible to secure for the apprentice the opportunity of some preliminary education before his apprenticeship begins without making its absence a bar to engagement. With this object we recommend that selected works should be registered and asked to keep registers of candidates they are prepared to engage on vacancies occurring, entries being made therein (*a*) at the request of near relations of workmen employed in the shop, and (*b*) on recommendations by the Director of Public Instruction, of the boys who have gained an elementary knowledge of the "3 Rs," and are otherwise fitted and desirous of apprenticeship to some special trade.

(ii) *The probation of pupils.*—

A three months' probation before the indentures are made out is necessary in the interests both of the pupil and the shop; the pupil may have made a wrong selection of a trade, or he may be found unfitted in many ways to follow it; he should be able therefore to leave the shop without prejudice to his character or prospects.

(iii) *The execution of indentures.*—

In order to secure the completion of a proper course, every pupil who desires to receive training in a selected workshop should be apprenticed by regular indentures. Later the completion of these indentures by the head of the shop will form a certificate of fitness, and it would probably follow that the value of this certificate would be recognized to the prejudice of uncertificated men.

A simplified and less costly system of indentureship seems to be required. It would materially facilitate the achievement of the object in view if measures were taken to secure an improvement in this direction.

(iv) *The holding of examinations to test progress.*—

In order to reduce to a minimum the interference with the management of the selected shops regarding the methods or practice of the instruction, that is

considered suitable for the apprentices, it will be sufficient to fix periodical tests of work to be attempted voluntarily by any apprentice. The satisfactory execution of this test should be noted on the indentures, or in their absence a certificate would be issued to the pupil. It may be left to the management of the shop to determine whether it will consider excellence in these tests as necessary for the completion of the indentures or not, but in any case proof of the fact that the apprentice has passed a series of graduated tests will be of no little value to him in the labour market, and it may reasonably be expected that Managers of factories would, in time, give preference for employment to those who hold such certificates. It would be desirable that the tests should be fixed in consultation with the Managers of factories holding a good position in the trade.

(v) *The giving of money rewards to the chargemen or mistris who have been responsible for the training of the apprentices who have passed the tests.*—

It is important to enlist the sympathy and interest of these mistris, and any expenditure undertaken with a view to securing this object seems to offer a prospect of more valuable results than a much higher rate of expenditure devoted to attempts to teach the same boys in Government Industrial Schools. For further details, see paragraph 26 i.

(vi) *The providing of hostels.*—

Hostels might be maintained in the vicinity of factories for apprentices of class (*b*) (see sub-para. i. above). This would provide for their moral welfare when they have to leave their homes in order to secure work at a distance.

Control of instruction in Government factories.

22. Railway Workshops, Dockyards, Harness Factories, Printing Presses, Gun-carriage Factories, etc., which belong to Government, present useful openings for the training of artisans. The officers in charge of these institutions should be consulted with a view to fixing the greatest number of apprentices admissible for training. They would be held responsible for affording the boys sent to their factories reasonable opportunities of fitting themselves for passing the tests mentioned in paragraph 21(iv).

In consideration of the value which Government Factories possess as training schools for artisans, it seems desirable to secure that they should be maintained in a state of efficiency at least superior to that of similar private Factories in the vicinity. It is only in this way that they can afford to the apprentices admitted to them a training that would be recognized as valuable by private firms.

Control of instruction in private factories and workshops.

23. Owners of private Factories may not always be willing to offer facilities for the supervision by Government officers of the training which is being given to apprentices on their premises. There is, however, a very general complaint in industrial centres, such as Calcutta, Cawnpore, and Bombay, as to the difficulty of securing competent hands for various industries, *e.g.*, metal-work, printing, leather-work, wood-work, etc. Owing to the artisans being fewer than the requirements of the trade, there is considerable competition among employers for their services. Apprentices are thus able to secure employment at high rates before their training is complete. This state of affairs, apparently the result of temporary causes, is likely to interfere with any scheme for instruction, in so far as it enables them to secure good salaries without complete training. But, presumably, another result would be a disposition among employers of labour to accept a system of Government control of apprentices offering inducements to them to become better workmen. The following inducements for the firms are suggested—

(i) To place their names at the head of a list of firms entitled to receive Government orders;

(ii) To provide them with the best expert advice. (This would be of great value to small workshops.)

In illustration it may be remarked that the *Times of India* Press in Bombay is ready to undertake the systematic training of apprentices if given an indemnity for any extra expense involved, and probably other firms might be found ready to receive favourably the scheme of control proposed.

Instruction in small workshops.

24. There are in every town and large village a number of craftsmen's shops, in which learners are constantly being taught all manner of crafts. By holding out inducements, it should be possible to bring them under the influence of a Department of Government Control which will by means of expert advice

gradually improve the efficiency of the craftsman as a worker and as a teacher. We propose that the Casanova system of training by the apprenticeship-method should be adopted in a modified form. The Indian artisan is likely to offer strong objections to remove from his home to a Government building; he is moreover not yet accustomed to receive outside expert advice, and he is even suspicious of it. Until experiment* has shewn how these difficulties can be overcome, it is premature to counsel the adoption of this system in its entirety.

The modified Casanova system.

25. For the present endeavours should be limited to inducing craftsmen to admit expert Instructors or Inspectors of hand industries into their shops, to increase the number of apprentices and to give more attention to their instruction. If the Instructors be experts and able to make suggestions which will be of practical use to the craftsman, the latter's reputed conservatism will disappear and he will readily accept advice. It is essential for the success of this scheme that the Instructors be persons able to win the confidence of the craftsman. Suggestions for the creation of a staff of Instructors of Industries will be found in paragraphs 35 ii, 36, and 38.

Registration of best craftsmen and preparation of Tests.

It will be necessary to select and register the best craftsmen and their apprentices, and to draw up in consultation with the best available experts a series of tests for each trade, similar to those contemplated in paragraph 21, iv above. A good series of Tests is at present in use in Madras.

Inducements for craftsmen.

26. The following advantages may be held out as inducements to the master craftsman to give more attention to the instruction of his apprentices—

(i) Monetary rewards to the master craftsman for each apprentice who passes a prescribed test.

In paragraph 9 it was shewn that the average cost of training in existing Industrial Schools is about R60 per pupil. A great economy will, therefore, be effected if the master craftsman be paid even as much as R12 for each apprentice who passes the yearly test.

A system of "payment by results" though justly condemned when applied to literary schools, where it encourages cramming, is particularly appropriate to the encouragement of the acquisition of manual dexterity—a quality for which the best test is the result of the examinee's labour.

(ii) Loans by Government to craftsmen for the purchase of materials and tools.

(iii) The appointment of the master craftsman to be Sir Panch (chief elder) of the craft when he has specially distinguished himself as a teacher.

(iv) Free expert advice by expert Instructors as to methods of work, purchase of material, sale of goods.

(v) Free gifts of patterns and designs.

(vi) Assistance in purchasing improved tools and appliances.

It would not be difficult to arrange for the supply to artisans of the best European tools at cost price; at present they have to pay the very high rates charged by importers.

(vii) The purchase by the Principals of Art Schools and Curators of Industrial Museums of articles of exceptional merit.

(viii) The creation of facilities for the sale of the shop's outturn.

This may best be effected by forming associations of private individuals, who are anxious to assist in the industrial development of their country, who will manage sale rooms, or pledge themselves to extend their patronage to the registered craftsman in preference to others.†

Encouragement of apprentices.

27. For the encouragement of the apprentices the following inducements may be offered :—

(i) Rewards for exceptionally good work in the test examinations in the shape of small stipends or gifts of tools.

(ii) Certificates of having passed the tests.

(iii) Facilities for being indentured to large factories.

(iv) Admission to the hostels (described in paragraph 21, vi) attached to large factories.

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* See experiment being conducted at Lucknow, paragraph 7.

† See page 29, "*Art Industries.*"

Trade Guilds.

28. We have made enquiries concerning the existence of trade guilds.* The social affairs of each caste group of artisans are (except in Burma) commonly governed by the council of elders (or panchayet) which does not usually concern itself with trade questions or with the training of apprentices. There are indications in one or two places (notably in the jewellery trades) of the existence of associations which aim at regulating prices, output of work, and the relations between the master-craftsman and his workers. The control of the panchayet might be extended to such matters, and these organizations judiciously led could exercise a powerful influence for good, both educationally and in the introduction of improvements. It would appear sufficient to appoint two or three craftsmen to form together with the Sir Panch (referred to in paragraph 26, iii above) a guild committee. Such a body would be very useful in controlling the Inspectors of Industries and questions regarding the trade would be referred to it.

Trade Marks.

29. It might in time be found possible to create with the assistance of the guilds a system of trade-marks as a guarantee of good quality.

Future development on the original Casanova lines.

30. The scheme of control of hand industries which has been sketched involves the supervision of scattered workshops. In towns this system should eventually lead up to the introduction of the original Casanova system, since it may become possible to induce many craftsmen to gather under one roof or in one group of adjoining workshops. This development is much to be desired as it will not only facilitate supervision by the Instructors, but will render possible the placing of the group under a Superintendent responsible for the moral and physical well-being of the apprentices.

B.—Industrial Experiment.

The object of experiment.

31. It has been shewn in paragraph 16 that before improvements in method and appliances can be generally introduced, experiment is required. The objects of such experiment should be—

(i) to test the commercial value of any discoveries made in the Indian Institute of Scientific Research which give promise of possessing a commercial value.

It is assumed that an Indian Institute of Scientific Research will shortly be established.

(ii) to examine the methods and appliances of certain industries with a view to introducing improvements either—

(*a*) by suitable alterations,

(*b*) by the introduction of implements and processes used in other countries;

(iii) to test the practicability of producing at profitable rates goods now imported into India in large quantities, or of working up raw material before export;

(iv) to train instructors in the results of the investigations in so far as they lead to the discovery of improved methods and appliances suitable to Indian conditions; and similarly to train Inspectors for the control of the craftsmen selected to teach apprentices in their shops.

It appears desirable to draw attention to the fact that there is a risk of more harm than good being done to native industries by undertaking experiments unless under the advice of the best experts available, and after a previous thorough examination of the industry in all its stages; otherwise improvements may be discredited by being misapplied to the manufacture of goods for which they are not suited, and much promising ground for expert instruction may at the same time be overlooked.

Centralization and specialization of experiment.

32. It would not be desirable to undertake the examination of possible improvements in one trade at more than one centre in India, to commence with. The most economical course appears to be the specialization of such examinations by provinces in different trades. In this way the reduplication of similar experiments and presumably of similar failures would be avoided. We have therefore drawn up a scheme for specialized investigation. There would

* *Vide* Appendix VI.

doubtless be some advantages in having one great Central Institution for this purpose, and the expansion of the proposed Indian Institute of Scientific Research to include within its scope the training of Instructors for every indigenous industry would both increase its prestige and place at the disposal of the Director of the Institute a number of expert workers whose labours he could direct and utilize. While recognizing the value of high scientific control, we prefer to recommend the establishment of the Institutes of Industrial Experiment in certain industries described below, reserving for investigation at the Indian Institute of Scientific Research subjects, such as research in the properties of materials and production by scientific processes, which require the highest scientific skill available.

Industries selected for research.

33. The industries in which we consider research should be undertaken at once and the places where the research should be localized are:—

(i) The Textiles (silk and cotton) in Bombay.
(ii) Metal work in Madras.
(iii) Pottery and Chinaware in the Punjab.
(iv) Glass-making in the North-Western Provinces.
(v) Sericulture in the Central Provinces and Burma.
(vi) Lac, Tans, and Dyes in the Indian Institute of Science.

The reasons for these selections, the nature, scope, and the site of each Institute of Industrial Experiment are stated separately for each industry at the end of this Report.

Jails suitable for experiment in minor industries.

34. The Government have in the jails an excellent opportunity of experimenting in minor industries. If an article can be successfully produced and sold in a jail after labour and superintendence charges have been correctly debited, it is almost certain to be profitable when worked outside. It seems that high-class carpet weaving, improved chick-making, and mat-making, among other industries, were originally revived or improved in jails and subsequently taken up by manufacturers.

Method of utilizing the results of Industrial Experiment.

35. Better processes of manufacture, which are well known in other countries, are frequently adopted in India by enterprising firms. They import an Industrial Expert who trains native craftsmen to work under him. But such firms naturally take care to retain their monopoly of knowledge as long as possible. It will be the duty of managers of the Institutes contemplated to disseminate a knowledge of such improved process, tool, or machine as *may have been proved* suitable to Indian conditions and prices. This can be done in several ways—

(i) Native craftsmen may be employed in the Institutes to work out the experiments under the direction of Experts. The experiment having proved successful such craftsmen may be sent back to their workshops to work the process learnt and to teach it to their apprentices and neighbours.

This is practically the system of dissemination of a knowledge of the use of the fly shuttle now being tried by the Government of Bengal at Serampore.

(ii) Specially intelligent craftsmen who possess sufficient literary knowledge, or educated young men of the literary classes who have worked as artisans in the Institutes and have there acquired sufficient skill, may be employed as Expert Instructors and Inspectors of Industries, as contemplated in paragraphs 25 and 26, iv.

(iii) When the improvement cannot be introduced without a considerable capital expenditure, persons willing to invest may be given a temporary guarantee of interest on their investment during that adverse period through which every industry must pass in its infancy.

The Manager of an Institute should be rewarded whenever a new Factory is started by private individuals through his instrumentality.

C.—Training Schools for Instructors in Industries.

Normal schools for Instructors in industries in which experiment is required.

36. At the Conferences and in making inspections, the general need of training schools for Instructors in trades with complicated or secret processes was frequently brought to our notice. The Technical Colleges, the Schools of Art, and many Industrial Schools train a few Instructors, but there is no normal

school for Instructors in Industries in India. Little real improvement can be expected until men qualified to teach are available in sufficient numbers. It was remarked at some Conferences that no Provincial Government could afford the cost of maintaining a normal school of this description, nor alone utilise sufficient Instructors to justify its establishment, particularly in the case of schools specialized for trades. It was also felt that such a school would have to provide opportunities for experiment in processes and manipulation. It will be seen that the Institutes contemplated are particularly well suited to become Training Schools for Instructors in the Industries dealt with.

The training of Instructors in other Industries in which Experiment is required must be postponed until such time as it may become possible to open other Institutes.

Industrial Experts.

37. The Experts required to experiment and teach in such Training Institutions must for the present be imported in many cases. They would on first arrival have no adequate knowledge of India or its industries, and it would be generally necessary for them to remain on probation to confirm their characters as experts of suitable disposition and capacity. They would have to make themselves acquainted with the special characteristics of the native trades to be improved, and to experiment and make research in directions which offered possibilities of improvement. The Expert of experience would become a teacher of future Instructors, and would continue this work until he could be replaced by one of his best pupils; he would then be in position to travel about improving processes and manipulation, either in a single Province or in several Provinces.

Normal schools for Instructors in Industries in which experiment is not required.

38. As regards the training of Instructors in the principal Industries which are already well established in India it may be possible to procure in factories and workshops skilful workers of the foreman rank to serve as Instructors, Inspectors of native workshops, and Advisers to the native craftsmen. Training schools for Instructors in the Wood, Iron, and Mechanical Industries can be established in the workshops of the Engineering Colleges and for Instructors in the Artistic Industries in those of the Art Schools.

D.—Special Proposals for Aided Schools.

General Scheme.

39. In the list of schools which has been compiled from the data supplied to us 123 institutions figure, of which 39 are either Government schools or are managed by District and Municipal Boards. The remaining 84 are private schools, aided and unaided, the majority of which are connected with some Missionary body. The real number of private schools is probably considerably in excess of this figure, and it is therefore a matter of considerable importance to frame some scheme by which the training given in them may be controlled. While we recognise that literary education is outside the scope of our enquiry, we are nevertheless concerned in recommending the best method by which artisans and chargemen may be fitted for their life's work, and we do not think that a reference to the proper character which preparatory education should take is out of place in treating of private schools. The fact that the boys are in the majority of cases orphans to whom the Superintendent of the school stands *in loco parentis* makes it possible to control their education more completely than in other cases. We therefore recommend that instruction in such schools be divided into two parts—

(i) Primary manual training,
(ii) Trade instruction.

Primary Manual Training.

40. The first should include Literary Instruction (up to the standard of the Lower or Higher Primary Vernacular), Drawing, and Manual Training. *It is essential that this last should be regarded as an integral part of general education and not as being intended to impart a knowledge of a trade.* Its function is to develop those faculties which will subsequently enable the pupil to learn any trade quickly and thoroughly. In the past in India the true function of Manual Training has not been kept in view, and it has become somewhat discredited because it has failed to turn out competent artisans. The pupils should remain in these schools till they have at any rate passed the Lower Standard, but preferably till the full course has been completed. The schools will be under the Educational Department and eligible for grants-in-aid.

41. The Trade Instruction should be such as aims definitely at fitting the boy for one particular trade, and not such as will leave him at its close uncertain what calling to follow and not properly qualified for any. We have already laid stress on the fact that a working knowledge of a trade can only be gained in a factory or craftsman's shop, and it remains to indicate how this condition can be fulfilled in the case of private schools. The training might be given in any of the following:— *Trade instruction.*

(i) A registered workshop.
(ii) An attached factory.
(iii) An instructional workshop.
(iv) An institution of the Casanova type.
(v) A registered craftsman's shop.

The special circumstances of each case must determine which of these methods will be followed, and the Superintendent of the school should decide this in consultation with the Provincial Chief Inspector of Factories. (See paragraph 53, iii.)

(i), (iv), and (v) have been already described. (See paragraphs 21, 6, and 24, respectively.)

42. *Attached Factory.*—By this term is meant a factory started by some private Company, in the vicinity of a school, with the professed object of giving employment to the pupils on the completion of their school course. A beginning has already been made in this direction by the Industrial Missions Aid Society, of which Mr. W. H. Fry is a Director. The Society has built a Carpet Factory at Ahmednagar,* in which it gives employment to the pupils of the Sir M. Petit School of Industrial Arts attached to the American Mission. Though this Company was started from philanthropic motives, it is conducted on purely business principles, and its promoters are prepared to extend their operations in any direction in which success may fairly be anticipated. This Society goes some way to supply that "separate organization or help" in the commercial side of industrial training which has been referred to in the resolutions of the Simla Conference, and the establishment of its factories might be welcomed in connection with Government as well as Private Industrial Schools. The location of an attached factory in proximity to the school is of mutual advantage, as the school authorities are kept fully informed of the results of their training, and defects can be pointed out and remedied. *Meaning of "Attached Factory."*

We would suggest in this connection that the establishment of factories of this kind near the Lahore and Bombay Art Schools, would be of great advantage, enabling the Principal to apprentice his pupils when they pass out of the school, and to retain the boys who at present leave before they have thoroughly mastered their trade.

43. *Instructional Workshop.*—By this is meant a workshop which is started by the governing body of the school, with the object of giving trade instruction. It differs from an ordinary workshop in the proportion of apprentices to workmen and in having a more carefully regulated course of instruction for the apprentices. In a commercial factory the great majority of the employés are workmen; in an instructional workshop the bulk of the employés will be apprentices. When such a workshop, which can only be started in connection with a private school, is considered the most suitable means of imparting the trade instruction to the past pupils of a Manual Training School, building and equipment grants should be given under the conditions usually imposed in the case of aided literary institutions. The Management of the workshop will receive a grant for each boy who passes the prescribed tests. *Meaning of 'Instructional Workshop.'*

If special conditions render it impossible for the trade instruction to be given locally, the governing body of the school should be encouraged by a building grant to erect a suitable hostel in the vicinity of a registered Factory, in which the boys may live under due supervision while gaining their trade education in the Factory.

E.—"Night" Schools.

44. We have used this term to include any class for giving instruction to working artisans and apprentices at whatever period of the day it may be held. *"Night" schools.*

Some arrangement is required to allow the more intelligent and energetic apprentices and workmen to rise to a higher level if they can. This, it is

* The prospectus of this Society will be found in Appendix VII.

considered, can best be done by the institution of "*night*" schools or out-of-working-hours classes. As workshop hours and school hours correspond in period, it is evident that neither the apprentice nor the ambitious workman can educate himself to a higher level unless some means of instruction is open to him outside his working time. These schools should—

(i) give instruction in any special subject (such as drawing and designing) which the workers at a particular trade may need for their improvement,

(ii) afford an opportunity to capable workmen of gaining the knowledge necessary to qualify them for the posts of chargemen and foremen. (A chargeman is a lower grade foreman.)

Subjects for "night" schools.

45. The subjects to be taught in these classes must be settled in consultation with the heads of local manufacturing concerns. Doubts have been expressed as to the probability of their success, but we are convinced that if the Managers of Factories and Workshops co-operate success will be assured. In some instances Managers have already expressed their willingness to grant early leave from work to their men to attend them. Workmen and apprentices will be quick enough to avail themselves of the opportunity of gaining any knowledge which they see their employers desire them to possess and for which the employers are willing to pay. Attendance at these classes should be purely voluntary and a small fee should be levied.

Instruction in Drawing and Designing.

46. In several industries, particularly those connected with Art, such as damascening, embroidery, lace-work, ivory-carving, etc., the only expert assistance the craftsman really requires is instruction in drawing and designing. The artisan's manipulation in such industries is almost perfect, but he has not sufficiently wide experience to enable him to introduce suitable new forms to replace those which have fallen into disuse. In former days damascene-work was extensively used on arms and accoutrements for which it was very suitable; under modern conditions the demand for this class of work having fallen off, the artisan either copies unsuitable European articles for which there is a very limited and precarious sale, or neglects his craft for some more remunerative occupation. If he were supplied with suitable models of form and taught to design he would have a better chance of making a living.* The instruction in drawing for Art Work will require very careful arrangement and superintendence to ensure that more harm than good is not done.†

F.—Training of Foremen and Chargemen.

Foremen and Chargemen.

47. We have now stated the principles and explained the system on which Industrial Instruction for workmen should be based. The methods of fitting men for the supervision of artisans as foremen and chargemen are described in a separate note attached to this Report (see page 25).

G.—Recommendations for Existing Schools.

Action recommended regarding existing schools.

48. We now propose to indicate briefly the reforms which appear to be required in existing institutions in order to secure conformity with the principles described.

Bengal—

The only school supported by Government which is wholly devoted to training artisans is the school at Ranchi; the other artisan schools are either under private management or are aided by District Boards and Municipalities.

Mr. Slater writes: "There are only 664 artisans in all classes of schools whose returns are sent in, including Art Schools. This is a small number compared with the size of the Province. The chief difficulty in connection with this class is to induce boys to join. By offering scholarships District Boards do manage to get a few, but a good many are the sons of literate parents, who merely join for the sake of the scholarship and have no intention of following the trade they learn in after life. Some sons of artisans are induced to join, but they will not stay long enough to become really good

* The question of "markets" is referred to in Appendix VIII.

† See the Chapter on "Drawing" in the Report on Practical and Technical Education by Sir E. C. Buck, Kt., K.C.S.I., reprinted in Appendix X.

workmen and so help to raise the standard of *bazar* work, which is what is required."

We do not think that these classes and the Ranchi School are likely to produce valuable results. If it is considered desirable to retain them we recommend that any general education now given in the school be withdrawn, and voluntary "*night*" schools with small fees substituted, the working day being wholly devoted to industrial work at specialized trades; that the number of instructors be increased to a proportion of not less than one to each five boys, and that these instructors should work with the pupils at the trade. The pupils should be carefully selected and indentured, as far as possible on the lines recommended for training in factories and workshops. Scholarships should be gradually reduced. At the same time every effort should be made to pass the pupils into suitable employment as they become fit. The school should resemble a workshop and work for a profit.

The Behar School, the Survey Schools, and the District Board Schools are mainly devoted to the preparation of men for Public Works employment either directly or through an advanced course at Sibpur. The workshop classes in these schools should be classified as Manual Training classes, and the artisan classes attached to them should, if continued, be clearly separated from the Manual Training classes and treated in the manner recommended above for the Ranchi School.

North-Western Provinces and Oudh—

In the North-Western Provinces and Oudh the only Government Industrial Schools are the classes at the Roorkee College, and the Industrial School at Lucknow. The experiment with the Casanova system is being attempted on lines suggested by us with the approval of the Local Government. The Industrial Classes at Roorkee are conducted in practical conformity with our recommendations.

The Punjab—

In reference to the schools in the Punjab, we recommend that they should either be continued as Schools for Manual Training, or be dealt with in the manner which we have suggested for the Ranchi School and Artisan Classes in Bengal. It should be decided whether the Railway Technical School, Lahore, is to train artisans, in which case the school should be dealt with in accordance with the proposals made for Bengal, or whether it should continue to train draughtsmen, sub-overseers, carriage examiners, and similar employés. In the latter case the school should no longer be considered to be an Industrial School, and the course of training should be adapted to its recognised aim.

The Central Provinces—

There are no Government Industrial Schools in the Central Provinces. There are some 30 Mission Industrial Schools which have practically adopted the apprenticeship or factory system.

Bombay—

In Bombay there are five Government, five Local Board, seven Municipal Board, eleven Aided, three Native State, and one Unaided schools: 32 in all. The Government and the Aided schools are mostly worked on Dr. Thomson's Manual Training System which appears to produce good results as far as hand-and-eye training is considered; but it cannot be held to be a satisfactory method of Industrial Instruction. We consider that schools worked on this method should be classed as Secondary Schools. The general opinion of those present at the Conference was that Dr. Thomson's system was unsuited for the training of artisans. The Reverend Mr. Smith did not express this opinion, but it was found that at the Ahmednagar School he was following a much more practical system for the instruction of his pupils than that prescribed by Dr. Thomson.

For schools which are to be classed as "Industrial" in the future the general education should be replaced by "*night*" classes—the instruction in industries should be specialized, and the number of working instructors and artisans should be increased to not less than one to each five pupils; articles should be made for sale by instructors and pupils working together.

Madras—

In Madras there are two Government, three Board, and five Private industrial schools; in addition there are nine other schools in which carpentry only is taught. There are regulated courses of instruction and technical

inspection. The method in force is a practical one approximating to an apprenticeship; the results are promising. The only important change required is to replace the general education by "*night*" schools, and to reduce the number of apprentices where it exceeds five for each craftsman.

Burma—There are at present no Industrial Schools in Burma.

CHAPTER IV.

CONTROL.

Imperial control.

49. It seems essential, if the errors already committed are not to be repeated in the future and if instruction in industries is to proceed along useful lines, that a whole-time officer should be appointed to control Industrial Instruction, and to direct all measures for the promotion of industries by experiment. He would serve the Government of India in a manner similar to the recently appointed Director-General of Agriculture. The industries of India are probably as much in need of advice and control as agriculture. We consider that any progress which may be made in the future towards securing a more satisfactory education for artisans in the methods of their trades is dependent on the continuous influence which can be exercised by a single officer with the Government of India, who will be in a position to co-ordinate and utilize the experience gained in all the Provinces. Such an officer would be able to prevent the waste of effort that is to be observed at present when each Local Government is endeavouring to work out by experience the best system of instruction for artisans and the most valuable form of assistance to local industries.

In further support of this recommendation it may be urged that the methods of industrial instruction employed in India are practically *special for the Province and not for the trade,* they vary from a simple manual training, through all the grades of teaching, to an apprenticeship in a commercial factory. If any method were special for a particular trade it might reasonably be supposed that it was adapted to that trade; but this is not the case. It was generally recognized by the local authorities consulted that greater efficiency could be secured in the future if some form of centralized control were provided by the Government of India. At the Conferences the unsatisfactory results achieved by the methods of instruction now employed were admitted, and it was in most cases stated that the Educational Department would welcome the appointment of officers with technological training to take charge of the duties of control which rest now on officers not specially fitted for them, and that the appointment of an Imperial Officer to control Industrial Instruction was desirable.

We therefore venture to suggest the appointment of an officer to hold the position of Director of Industries and Industrial Instruction with the Government of India, and we are convinced that it will be difficult to secure satisfactory progress without such an appointment.

Qualifications of Imperial Officer.

50. The qualifications of such an officer should be a sound scientific and commercial education, combined with business habits, and, if possible, artistic tastes. It is admittedly impossible to obtain a general technological expert, but an energetic and capable man with a scientific training would soon acquire sufficient acquaintance with the industries of India to enable him to fulfil his duties with efficiency. It is probable that a scientific training in electrical engineering, or manufacturing chemistry, or better still, in both, would be most suitable.

Duties of the Imperial Officer.

51. The duties of this officer would include the introduction of the new system of industrial instruction sketched in this Report, the general control of the working of this system when in practice, the prosecution of experiments in improvements of Indian industries, and investigation of the financial results of manufacturing in this country goods at present imported, or raw material exported for manufacture elsewhere. It might ultimately be found desirable to entrust to the same officer the general direction of the administration of the Factories Act throughout India.

Provincial control.

52. If these recommendations be accepted, it will be necessary to focus the management of the schools and training establishments under each

Government through a Provincial Officer with technological experience. The Principals of the Engineering Colleges in Bengal and the North-West Provinces and Oudh, the Principals of the Art Schools in the Punjab and Madras, Mr. Tilly, now Collector of Customs in Burma, and the Government of the proposed Victoria Technical Institute in the Central Provinces were proposed at the Conferences as the most suitable existing agencies for the future supervision of Industrial Instruction. In Bombay the appointment of a special officer was proposed. Although these officers might be entrusted with the control of Industrial Instruction provisionally, we are of opinion that it would for many reasons be preferable to avoid a system of special appointments and to entrust the provincial control to a Chief Inspector of Factories for each Province. It seems probable from the replies received at the Conferences that Local Governments would consent to the Educational Department being relieved of the control of Industrial Instruction. A Chief Inspector of Factories would, we believe, be the most suitable officer to select for the exercise of this control in future inasmuch as he is already in touch with the work being carried on in factories, and it is in factories that it may be possible to give much of the Industrial Instruction in the future if our proposals on that point be adopted.

Duties of Provincial Officer.

53. The duties of the Provincial Officer would be:—

(i) To control the instruction of the apprentices in factories and to arrange for the connection which it is desirable to establish between primary schools and factories (see paragraph 21, i).

(ii) To supervise in person and through a staff of Instructors the training of apprentices in craftsmen's shops (see paragraphs 25 and 30).

(iii) To inspect aided industrial schools carried on upon the revised systems described in paragraphs 39 to 43.

(iv) To control the special agencies for disseminating the results of industrial research (*vide* paragraphs 35, i and ii).

Where there are at present not sufficient Factories in a Province to have required the appointment of a full-time officer as Chief Inspector we think that these additional duties will be sufficient to justify such an appointment being made at a very early date.

Control of Institutes of Industrial Experiment.

54. For Industrial Experiment and the control of the Training Schools we would propose that men who have already been in charge of Factories and who have a scientific knowledge of the industry should be selected. In the first place it will probably be necessary to import such men from abroad. The assistants should be the best Experts procurable. Inasmuch as these officers will be working for the whole of India we are disposed to consider that they should properly be Imperial, as well as the Institutes of which they will hold charge. The separation of the control of education and research is, we understand, directly contemplated by the resolutions of the Education Conference.

We are not unaware of the fact that the establishment we propose may seem excessive in view of the uncertainty which exists regarding the success of the special system of instruction recommended. There is also a possibility that the results of experiment might prove that little can be done towards introducing improved methods and appliances or new (hand) industries into India. We are, however, convinced that without such an establishment there is little prospect of any successful instruction of artisans or of any material advance in the industries of the country on which further instruction could be founded. Without building too much on the prospects which such control seems to offer, we would strongly recommend that the necessary establishment should be provided, at least provisionally perhaps for five or ten years, in order that the possible limits of Government intervention to save the industries from their alleged present tendency to deteriorate may be tested and established by action, even though it be of an experimental nature.

Inspection of craftsmen's workshops.

55. For the inspection of the small workshops referred to in paragraph 25 and for the dissemination of the results of experiment we would suggest the appointment of such number of Instructors as may be required by each Local Government, these Instructors being trained either in the Institutes of Experiment as contemplated in paragraph 36 or as indicated in paragraph 38. They would be placed permanently under the orders of the Chief Inspector of Factories.

Control through local bodies.

56. In the control of rural and urban instruction either in craftsmen's shops or subsequently in institutions of the Casanova type, it seems desirable to make use of the assistance of a small Committee of persons in the trade or specially interested in industrial work whose powers would be limited to inspecting and reporting to the Chief Inspector of Factories. Frequent inspections by this Officer or his staff would be indispensable, but we desire to lay special stress on the absolute necessity of enlisting the interest and sympathy of the craftsmen themselves in any scheme of instruction which is designed for their benefit. Hitherto schools have been instituted to teach industries without any attempt to proceed on lines that would generally commend themselves to the artisans for whose improvement they were established, and in ignorance of their requirements. A system of instruction to be given in the craftsman's shop offers some security against the repetition of this error in the future. It will still, however, be necessary to keep the objects of the scheme constantly before the local representatives of the trade in order to enlist that support which is so necessary to its success.

Influence of Guilds.

57. In paragraph 28 some reference has been made to trade guilds. We are of opinion that the best channel of communication between the Provincial Staff and the craftsman would be the Panchayet of the caste or of the Guild where guilds exist. Measures taken with the support of this Panchayet would be received with less suspicion by the craftsman, and the weight of their authority in social matters would offer material support to official action in carrying out the new scheme of instruction. In the dissemination of the results of industrial experiments the Panchayets would again afford valuable assistance. We would therefore insist on the desirability before all things of selecting for the post of provincial controlling authority an officer of such previous training and character as would specially fit him to deal with the artisan communities in a broad-minded and sympathetic spirit. The prospects of industrial progress in India must for many years largely depend on the attitude adopted by the handworkers of the country. For these, instruction and improvement can only be satisfactorily secured by enlisting the assistance of their leaders, without attempting to break suddenly with the methods and organization that have for centuries controlled the progress and destiny of the craftsmen.

CONCLUSION.

Industrial Survey.

58. In the absence of a complete survey of Industries, we have found it impossible to make detailed recommendations as to particular industries and the methods of instruction that may with advantage be applied to each. The making of such a survey must necessarily precede the development of any scheme of Industrial Instruction. A note on Indian Industries which will, it is hoped, be found useful to officers making a survey will be found at the end of this Report. It shews in a striking manner the great importance of some industries which have hitherto received scant attention.

In concluding this Report we desire to express our deep sense of the obligation we are under, to all the Governments visited, for the courtesy and readiness with which all available information was placed at our disposal, and to those gentlemen, official and non-official, who either personally attended the Conferences, often at considerable personal inconvenience, or submitted valuable opinions in writing.

J. CLIBBORN.
C. A. RADICE.
R. E. ENTHOVEN.
F. WESTCOTT.

27th February 1902.

I desire to add recommendations that—

(i) An adequate sum be set apart for investigating the possibility of profitably working the iron ores of India.

(ii) An Institute of Industrial Experiment in the Tanning Industry be established near Calcutta.

My reasons for making this suggestion will be found on page 24.

(iii) Efforts be made to establish Industrial Banks.

C. A. RADICE.

THE INSTITUTES OF INDUSTRIAL EXPERIMENT.

Institute of Experiment in the Textile Industries.

The hand-weavers of India are numerically by far the most important class of artisans,* but this fact seems scarcely to have been adequately recognised at the time of starting industrial schools; nor was any attempt made, until recently, to test the possibility of introducing superior methods and appliances in their trade. In Madras weaving has recently been introduced in two industrial schools, and an attempt is being made to teach the use of warping machines and the fly-shuttle, while in Bengal a systematic attempt is now being made to spread the knowledge of the fly-shuttle in the manner referred to in paragraph 35 i of the Report. If any real progress is to be made in testing the value of the many possible improvements that might form the subject of instruction to weavers in the future, it appears necessary to focus research into such improvements at one centre which may serve primarily as an experimental workshop, and secondarily as a normal school for instructors for all India. It would only be possible for an expert to decide what new methods and appliances should be tested in such a workshop, with a view to subsequently disseminating a knowledge of their use throughout India. At the same time a *primâ facie* case for engaging an expert and placing the necessary funds for investigation at his disposal seems to exist in the following apparent defects in the methods and appliances at present in use—

(i) *Silk Reeling.*—

Defects in the industry.

The silk used by the weavers is generally unevenly reeled. The reeling of an absolutely even filature has been pronounced by experts to be imperative, if Indian goods are to sell in foreign markets.

(The remedy for this defect is discussed in the description of the Institutes of Industrial Experiment in sericulture on page 22.)

(ii) *Warping of yarns and silk.*—

Simple machines are available for warping yarns and have been introduced with some success in the experimental schools in Madras. A cheap and efficient warping machine might be found of service to hand weavers where they are gathered in centres of weaving.

(iii) *Sizing of Silk.*—

Indian silks are handicapped in the European market by being commonly overloaded with a quantity of foreign matter other than the necessary gum.

(iv) *The Loom.*—

In Madras city and in Serampore in Bengal as well as in the Chingleput and Yeraoda Jails an improved loom is already in use, which, owing to its fly-shuttle attachment, can produce 50 to 100 per cent. more cloth than the ordinary Native pattern of loom. There seems, therefore, scope for disseminating knowledge of the improved loom already at work in India, and for experimenting with many types of improved looms (of which some may perhaps be found in China and Japan) with a view to ultimately placing the most efficient machine in the hands of the Indian weaver.

(v) *Manufacture of new descriptions of goods.*—

With improved machinery it would possibly be open to the Indian weaver to attempt to regain some small part of the share in the European textile market of which the introduction of machinery has deprived him; that is to say, his cloth might compete with the hand-woven fabrics of Europe, which are now being produced in increasing quantities. But first it would be necessary to conduct experiments in producing these goods, and to ascertain by enquiry the prospects of their being placed on the home market at selling prices.

(vi) *Printing.*—

Simple machinery is available for improving and cheaping the process of block-printing on cotton and silk goods. The suitability of such appliances to the conditions of hand-printing in India appears worthy of examination.

Condition of the industry.

A perusal of the special monographs compiled in each province on the subject of the silk and cotton industries discloses the following opinions of

* In 1901 almost 5,800,000 persons were supported by cotton spinning and weaving. No other industry supported more than 2,320,000.

local officers specially appointed to investigate these industries, regarding their condition and the need for Government assistance.

Silk.

Bengal—

The manufacture of silk is a decaying industry. Silk materials can never be of commercial value until machinery for "throwing" the silk is introduced. The establishment of a school of silk-weaving is necessary.

North-Western Provinces and Oudh—

The silk fibre produced in these Provinces is "gummy" and the filaments do not yield a continuous thread. Expert advice may find a remedy for these defects. The industry is in need of encouragement.

Punjab—

The industry is prospering on the whole.

Central Provinces—

The weaving of tasar is hampered by shortage of raw material. Tasar worm-rearing needs expert advice and encouragement. The tasar worm is suffering from a form of pébrine.

Bombay—

Silken goods woven are inferior owing to irregular filature and imperfect sizing. Experiments in sericulture have so far been a failure.

Madras—

The industry is declining. The weavers are anxious for technical advice and instruction.

Burma—

The same defects are observable as in Bombay, and advice is required in sericulture. Experts who examined the silk in 1882 declared the thread imperfect and length of reel too long. They said that if technical skill were brought to bear, the silk might compete with China and Bengal.

Cotton.

Bengal—

The introduction of an improved *charki* for ginning, the spread of the fly-shuttle and the improved reeling of warp is recommended. The industry only requires assistance to recover lost ground.

North-Western Provinces and Oudh—

Expert supervision is required for the improvement of the industry.

Punjab—

The industry is extending.*

Central Provinces—

Improved hand-looms are required, and the industry is said to be greatly in need of Government assistance.

Bombay—

Experiments with improved looms should be undertaken and the weavers taught to make goods for a wider market.

Madras—

There is a marked deterioration in weaving. A school of weaving and printing is proposed. The weavers are anxious for advice.

Burma—The industry is in a decaying state owing to the competition of imports.

Bombay proposed as site.

In centralizing further experiments into possible improvements, it seems desirable to select the centre of the textile industry for an institution where an expert should be employed and provided with any machinery and skilled assistance that may be found necessary. Bombay with 83 per cent. of the weaving mills of India would seem to us the most suitable locality. It would not be necessary to interfere with the measures taken by the Bengal Government to spread a knowledge of the fly-shuttle, nor need the Madras experiments be summarily abandoned.

It is, therefore, proposed that a Textile Experimental Institute be established in Bombay.

Staff.

The establishment required would probably consist of a Manager in charge and assistants for—

(*a*) Warping and sizing.
(*b*) Weaving.
(*c*) Printing and dyeing.

Provision for a capital expenditure of two lakhs and for half a lakh annual expenditure would probably be sufficient to secure the institution being

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* NOTE.—The most recent census statistics hardly seem to support this view.

adequately equipped with all necessary appliances, and supplied with a competent staff of experts.

Institute of Experiment in the Metal Industries.

Madras proposed as site.

In Madras among the printed proposals submitted to us at the Conference was one for the institution of a Metal Work School. There already exists in the School of Arts in that city a department of metal-work which has of recent years been mainly devoted to the promotion of the aluminium industry in India, and the success which it has attained is evidenced by the formation of private Companies to develop the trade. If, as we have recommended, in paragraph 18 of the Report, a time be now fixed for the termination of this experiment, the skill and energies of the staff might be utilised in training workers in the production of other kinds of metal-ware. Part of the necessary plant is already available, but we would recommend better workshops being provided in a more suitable locality.

Necessity for Institute.

Though Mechanical Engineering Shops have developed rapidly in this country in recent years, it is only necessary to turn to the list of imports to see what an immense field still remains to be occupied. Excluding manufactured iron and steel, with railway plant and machinery, the imports of cutlery, brass, copper, lead, tin, and alloys exceed 230 lakhs of rupees in value. Some at any rate of the articles thus imported could be made in the country, to the gain of the native artisan.

The Institute as a Training school.

Apart, however, from the introduction of new manufactures, existing factories find great difficulty in obtaining sufficient skilled labour, and in every Province the need of more and better trained metal-workers was impressed upon us. In native methods of manufacture, there is room for great improvement; whether in moulding, casting, or finishing the methods and implements used are generally primitive. In the existing Industrial schools metal-work comes second in the list of subjects taught * but there is no Institution from which trained teachers can be obtained. The ordinary bazar craftsman has, as a rule, to be employed.

Provision for a capital expenditure of one lakh and an annually recurring expenditure of half a lakh would probably be found sufficient.

Institute of Experiment in the Pottery and China-ware Industries.

Necessity for Institute.

The Pottery Industry of India affords a means of livelihood to 1½ million persons. Earthen and china-ware to the value of 26 lakhs of rupees are imported annually into India; quite half of these imports are not manufactured in Great Britain. These facts indicate the necessity of studying this industry with a view to its improvement.

Defects in the Industries.

The monographs which have been prepared by local officers in each province afford a sufficient indication of the principal defects which at present appear to prevent the development of the industry. Throughout India the methods and tools employed are inefficient; the outturn per worker is very low; ignorance of the most suitable clays is the cause of the bad quality of many of the wares; much loss by breakage during the process of baking and much waste of fuel are caused by the imperfect nature of the kilns; the use of glazes is practically unknown; although deposits of China clay exist in several places in India, china-ware is not manufactured.

Delhi proposed as site.

For the following reasons Delhi appears to be the most suitable site for the institute:—

(i) The Punjab and the North-West Provinces jointly support almost half the potters of India.

(ii) In this area the artistic side of the industry has developed more than elsewhere; some of the wares produced have a wide reputation.

(iii) The Hindu, being prevented by his religion from using earthenware more than once for food, will only purchase the cheapest ware and cares nothing for its quality. A market for an improved article must, therefore, be sought among the wealthy Muhammadan population of Northern India.

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* *Vide* Appendix IX.

(iv) Delhi is centrally situated as regards the Muhammadan population concerned.

(v) Deposits of China clay are said to exist near Delhi.

(vi) There are in Delhi a number of families of expert potters, some of whom make a good type of art ware ; they are desirous of being taught improved methods.

The large number of potters in Bengal and the existence of a large prosperous Muhammadan population in Eastern Bengal suggest that the Institute should give special attention to the dissemination of its improvements in that direction.

A manager with assistants who should be experts in china-ware, *terra-cotta*, and glazed earthen-ware would be required.

Provision for Rs. 10,000 capital and Rs. 37,000 annually recurring expenditure would probably be found sufficient.

Institute of Experiment in the Glass Industry.

Experiments already made.

The facts that the imports of glass-ware into India amounted in 1902 to 95 lakhs of rupees and that this industry supports over one and a half lakhs of workers and dependents indicate the importance of the industry.

Attempts to manufacture glass articles from glass made in India have hitherto failed, but in each case the failure is attributed to removable causes. The writer of the Monograph prepared under the orders of Government on the Glass Industry of Bombay attributes the failure of an attempt made in that province to the use of impure alkali. The author of the Monograph for the North-West Provinces, referring to the failure of three successive attempts to manufacture good glass writes:—"It will be seen from this account that no serious and steady attempt has ever been made to produce in India glass articles resembling those of Europe. The experiments made have in each case been continued only for a short time and have failed from accidental causes and not from the impossibility of success. The difficulties to be encountered consist first in lack of technical knowledge, and, secondly, in the composition of the Native glass." There appears therefore to be a case for further experiment by persons possessed of the necessary qualifications.

Aligarh proposed as site.

The centre of the glass industry of India lies in the Aligarh, Mainpuri, and Etawah districts of the North-West Provinces, whence large quantities of crude glass are exported to all parts of India. In the North-West Provinces the industry supports about 66,500 persons. It therefore appears desirable to locate an institute of experiment in glass manufacture in one of the above-named districts, say at Aligarh, which is already an industrial centre.

We understand that Mr. Wagle, a Bombay gentleman, has studied the industry in England. He might be found capable of taking charge of the Institute. It is understood that he is disposed to accept such employment.

Provision for Rs. 10,000 capital and Rs. 22,000 annually recurring expenditure will probably suffice.

Institutes of Industrial Experiment in Sericulture.

Progress made in Bengal.

In Bengal sericultural operations of a successful nature have been carried out in the districts of Malda, Murshidabad, and Birbhum. Practical demonstration combined with model nurseries are producing healthy seed in increasing quantities with correspondingly favourable results on the silk trade, and the scope of operations is being extended. It seems, therefore, both practicable and desirable to treat Bengal as the Industrial Experiment centre for sericulture with a view to fully utilizing the results of experience already gained. The stage of instruction in improved methods and appliances having been already reached in this province, branch institutions should be started in the Central Provinces and in Burma, where silk weaving is carried out on a large scale, and where the industry is reported to be hampered by a short supply of raw material, particularly in the case of the tasar silk of the Central Provinces.

Sites proposed.

The employment of two experts is recommended, one for the Central Provinces and one for Burma, who would commence by studying the method followed in Bengal to develop sericulture, and would subsequently proceed to the Central Provinces and Burma to start similar nurseries and instruction

courses in the local silk-producing centres, *i.e.*, in Sambulpur in the Central Provinces, and in either Prome, Henzada, Thayetmyo, Tungoo, or Rangoon in Burma.

Cost of Sericulture Institutes.

The cost of such institutes would not be great. A study of the estimates recently drawn up in Bengal for extending the sphere of operations in progress in that province shows that a sum of Rs. 5,000 in each case for initial expenditure and of Rs. 10,000 per annum in each case for establishment and other recurring charges would be sufficient. Probably the whole of this sum would not be required until the operations had attained considerable dimensions. It would seem possible to obtain expert Superintendents for these institutes for a salary of ₹300 per mensem. It is important to lay stress on the necessity of including, in the course of sericultural instruction, demonstration of the use of the most modern implements for reeling the silk from the cocoons, with a view to correcting the defect in Indian silk referred to on page 20. Mr. Tata's Model Sericultural Factory at Bangalore might be able to give valuable advice on this subject, founded on recent experiment.

Scientific Research in Lac, Tans, and Dyes.

Lac.—Dr. Watt has written, in the Monograph on lac in the Dictionary of Economic Products, that lac is a resinous incrustation produced on twigs by a minute insect, it yields both a dye and a resin. The first has been displaced by better products and has now no market value, the latter is exported from India in large quantities (the value of the exports in 1902 was 96 lakhs of rupees). This resin is used in the manufacture of varnishes, polish, printer's ink and tall hats. Lac is mainly produced in the Central Provinces, Bengal, Assam, and Burma. The annual demand for lac exceeds the supply, London prices have consequently risen from 58 shillings per hundredweight in 1887 to 107 shillings in 1893. Dr. Watt fears that unless steps be taken to increase the production of lac a further rise of prices to a prohibitive level may endanger the trade. It may also be possible to establish a varnish industry and export.

Tans.—India exports 48 lakhs' worth of tanning materials, chiefly myrabolams and cutch. It is believed that improvement may be obtained in the quality of the myrabolams by gathering them earlier, when less of the tannin has ripened into sugar. There may be room for improvement in the manufacture of cutch.

Dyes.—The beautiful and fast tints for which Indian textiles have been famous are obtained from vegetable products by complicated processes requiring much skill. Dyeing was a trade known only to professional dyers. Every spinner can now readily obtain bright vivid but transient tints, which are pleasing to the uneducated eye, by means of mineral dyes imported mainly from Germany and Belgium (75 lakhs' worth in 1902). This has practically destroyed the old dyeing industry. Scientific research may succeed in facilitating the use of vegetable dyes, and organized effort may introduce the use of satisfactory mordants for the mineral dyes.

Scientific Research appears to be required in these materials. It would not be necessary to postpone action until such time as the proposed Institute of Scientific Research may be opened, it would be sufficient if provision were now made for work to begin in the existing chemical laboratories of Technical Institutions, or of the Reporter on Economic Products. An approximate estimate of the annual cost is appended.

	Rs.
One experimenter for lac and tans (salary and travelling allowance)	10,000
One experimenter for dyes (salary and travelling allowance)	10,000
Laboratory contingencies for two laboratories .	5,000
	25,000

Institute of Experiment for the Tanning Industry.

Suggested by Mr. C. A. Radice.

I would recommend that the study of tanning be taken up. Tanning is an industry which expands proportionately with the mortality of cattle, the greater the agricultural distress caused by drought the greater the demand for labour in the tanning yard. Raw hides, and skins to the value of 7 crores, tanning materials to the value of ½ crore were exported in the year ending on the 31st March 1901. Only 230,000 persons are supported by the tanning industry, it appears desirable to add to this number of persons who are probably most prosperous when famines are most intense. Private firms, notably at Cawnpore, have done much to develop this industry, yet much more could probably be done by spreading a knowledge of the Madras methods of tanning. The development of the tanning industry of Madras, as indicated by the following figures, is indeed remarkable.

It will be noticed that tanned hides are not exported from Calcutta and Karachi, the ports for Northern India, whilst almost 95 per cent. of the hides exported from Madras are tanned.

Ports whence exported.	Value of raw hides and skins exported.	Value of tanned hides and skins exported.	Totals.
	Lakhs of Rs.	Lakhs of Rs.	Lakhs of Rs.
Calcutta	555	—	555
Bombay	66	100	166
Karachi	42	—	42
Madras	20	349	369
Rangoon	16	—	16
Total .	699	449	1,148

An Institute of Experiment in the "Madras" and other methods of tanning, working in harmony with the researcher in tans, would probably be fruitful of much good.

NOTE BY THE PRESIDENT ON THE TRAINING OF FOREMEN AND CHARGEMEN.

In paragraph 44, attention was drawn to the value of night schools in affording an opportunity to the really energetic and intelligent workman or pupil to rise to the grade of chargeman. This system of natural selection to a post of responsibility is approved by many Works Managers and Locomotive Superintendents who value greatly the power such chargemen possess of managing the men among whom they have been brought up. There is no doubt that their experience is valuable—many of the greatest Engineers of old days were developed in this way. At the same time there are classes in India whose legitimate ambition is to become foremen and who are both by education and social position above the ordinary workman's grade. Moreover the advance of scientific methods and the call for economical production necessitates in the foreman of to-day a scientific training which his predecessors did not need. It is thus necessary for the State to provide a means by which the class referred to can obtain, on payment, that theoretical knowledge and practical experience which is required to fit them for their life's occupation.

It may be mentioned here that the theoretical knowledge required by this class is not that which is necessary for an Engineer. The standards fixed should be carefully graduated to the requirements of each case, on the best expert advice, and should be carefully revised from time to time to meet the changes in scientific methods. If these men are in the future to work their way into the Engineer or Manager grades, they should do so during the course of their business life by individual energy and intelligence.

The system of half-day work in technical shops attached to a school or college with a subsequent half-day at drawing and theory, either followed or preceded by some years of whole-day work in a commercial factory, was generally approved of. The college course will occupy about three years and the factory training two or three more. There was some difference of opinion as to whether the factory whole-day training should precede or follow the College course. There are advantages in both. When the factory training comes first from, say, the age of 15 to 18, the lad has an opportunity of finding out whether the life suits him or not, and the Manager can also judge if he is suitable for the trade; moreover he gets hardened in character and will be more likely to appreciate the theory he is taught later on. The disadvantage consists in the break in education by which he loses touch with his books and is removed at an early age from the careful discipline of school life. Both these disadvantages might be partially obviated in the factory by night schools and careful superintendence. Both systems can well be followed according to circumstances: thus arrangements could be made for the lad who having interest has entered a shop and after three years or so promises well, to join a Technical College and complete his theoretical and practical course there, receiving a full certificate. On the other hand boys from school who have no interest could compete for entrance to the Technical College and by a successful completion of the course, they would earn the right to an apprenticeship in a factory, to finish their training and earn the full certificate. In both cases it is the regular practice in the factory to pay the apprentice the rate of wages he is competent to earn, and to charge no fee. Opinions regarding the necessity for scholarships were divided. It was felt that the apprentice who had passed his college course first should be able to earn his support. In every case a sufficient fee should be paid for the college course which should include half-day practical work in a properly fitted technical workshop, such as that in the Roorkee College, *when the trade is mechanical.* When the trade is other than mechanical, special installations will have to be put up, or the school established in the neighbourhood of a factory, which is the course recommended.

It is necessary to say a few words with reference to school or college technical workshops. The objects of these installations should be, a training in that accuracy of measurement and fitting which is called for by modern scientific development, testing of materials, and the proper care of tools in addition to handicraft. For this a specially designed shop on a somewhat expensive scale is necessary. This will, it is expected, limit the places where apprentice foremen can be trained to the engineering colleges and to schools specially designed for this purpose. All the Indian Engineering Colleges should be fitted with such shops on the scale of that now existing at Roorkee, and special efforts should be made to attract Europeans and Eurasians to these classes in addition to Natives of India. The opportunity of a final training in large workshops and factories *should always be provided.*

NOTE BY THE PRESIDENT ON THE SPECIAL CONDITIONS WHICH INFLUENCE INDUSTRIAL TRAINING IN BURMA.

The position in Burma is special: the Burman has strong artistic instincts, he is rich compared with his fellows in other parts of the Empire, independent, and can earn high wages. He is distinctly fond of, and eager for, general education.

Messrs. Orr & Co. have for the past twelve months taken Burmans into their jewellery factory to work, and the same has been done for some time past by Native firms; but the Burman on the whole seems to object to work in a Factory and prefers his own home. Messrs. Oppenheimer have failed to attract a single Burman to their leather factory and employ imported labour. On the whole it is very doubtful whether the Burman will attend an Industrial School or even work as an apprentice with a craftsman unless he is artificially attracted by high stipends.

In Upper Burma the conditions appear to be similar, but wages are not so high, and there will probably be more desire to receive instruction.

The best of the art work is excellent in execution and design, but there is plenty of inferior work done; even in the best work the constructional details are faulty.

It is clear that any instruction that is given in Burma should be for the highest class of work and that the greatest care should be taken, particularly in the drawing classes, not to influence the spirit of the design.

NOTE ON THE INDUSTRIES OF INDIA.

By Mr. C. A. Radice.

It has been stated in paragraph 58 of the Report on Industrial Education that the lack of information as to the condition of industries renders it difficult to make detailed recommendations for the educational aids required by particular industries. Circumstances compelled the Committee to dissolve without attempting to collect the necessary information, but it was arranged that one of the members should prepare a Note on Industries.

Criteria of importance of each industry.

It is impossible to deal with the details of so vast a subject within the limits of a few pages, therefore this note deals only with the relative importance and the condition of each industry. The number of persons supported by each industry has been taken as the primary criterion of importance, the volume of trade, indicated by the exportation or importation of certain articles, as a secondary criterion; the increase or decrease in the number of persons as the criterion of the prosperity or decadence of each industry.

Number of persons dependent on each industry.

The number of persons has been obtained from the Census statistics. The 1891 occupation tables contained 502 different headings or *groups*, in 1901 occupations were re-arranged and divided into 520 *groups*, many of the 1891 *groups* were abolished, several were combined, new *groups* were formed to meet the requirements of rapidly developing industries, this has added in no small measure to the difficulty of comparing the number of persons supported by any given occupation in 1891 with the corresponding number for 1901.

It was necessary to limit the enquiry to such occupations as are industrial, and to combine cognate *groups* into main industries. It would, for instance, have served no useful purpose to deal separately with cotton cleaners, weavers, spinners, and cotton tape-makers, these persons have accordingly been brought together under the comprehensive heading "Cotton." In this manner 55 INDUSTRIES have been formed, each of which includes all the workers (and their dependents) who use similar tools or machines, follow similar methods of work, and handle similar materials. Sellers have usually been excluded, but many of the 1891 *groups* included both makers and sellers, it has therefore been frequently necessary to include the latter although enumerated separately in 1901. In a few cases the figures appear to be unreliable, this has been commented on in the appropriate place. The results obtained by this system of tabulation have been shewn in the charts on pages 31 *et seq.* An explanation of the charts will be found on page 30. It is hoped that these charts will be of assistance in determining what action is required in each Province.

Exports and Imports.

India has a large agricultural population thrown entirely upon the land and therefore liable to severe suffering in bad seasons. A population partly supported by manufactures can never suffer from climatic causes as one wholly dependent on agriculture, it would therefore be well to endeavour to shift a portion of the agricultural population into industry by fostering the growth of such industries as are likely to develop rapidly and provide industrial employment for a large number of persons. Attention has therefore been directed in the last four columns of the charts to those raw materials which are being exported in large quantities and those imported manufactures for which there is a great demand in India. The figures have been taken from the "Annual Statement of the Trade and Navigation of British India in the year ending 31st March, 1902," published by the Government of India.

Prosperity and Decadence of Industries.

The graphic representation adopted shews at a glance whether an industry is in a prosperous or decadent condition in so far as prosperity and decadence are respectively indicated by the increase or decrease of the population supported. The shadow of the last famines is clearly visible in the charts which deal with the hand industries of the provinces that suffered most, the splendidly prosperous condition of Assam, Burma, and Madras is brought out with equal clearness. The Bengal figures are in many cases misleading, they frequently shew a decline which is belied by other evidences of prosperity. The Census Superintendent for Bengal explains this phenomenon in paragraph 915 of his Report in the following words:—

"Most of the village industries shew a falling-off. It is slight in respect of brass, copper, and bell-metal workers, but in the case of potters, carpenters, and shoe-makers it is very considerable. There is not much room for difference of opinion as to the proper classification of these occupations, but there is another factor which has probably resulted in making the difference in

the figures more marked than it really is. I refer to the tendency of functional groups to return their traditional caste occupation to which reference has already been made. A man of a weaving caste will often call himself a weaver, even when his main source of income is derived from agriculture or some other employment, and there are reasons for believing that this source of error was removed to a greater extent on this than on previous occasions. The change of system in dealing with occupations combined with agriculture has also affected the figures to a considerable extent. At the same time it seems certain that machine-made goods are gradually replacing those made by hand in the villages. Shoes of English manufacture are rapidly displacing the country-made article, at least amongst the better classes; cheap cotton cloth from Manchester, known as *márkin*, is supplanting a stronger but more costly country cloth; amongst Mohamedans chinaware is being used instead of the local potter's earthen vessels, and knives, axes, etc., from Sheffield and the Continent are ousting the rougher implements made by the village blacksmith. The brass- and copper-smith holds his own, because the domestic cooking and other utensils of these materials have not yet been, and are not likely to be, replaced by enamelled saucepans or other imported substitutes, and the growing prosperity of the country leads to a constantly growing demand for them. I am unable to explain the great decrease in the number of persons returned as saltpetre refiners and sellers. The quantity of saltpetre extracted is very little less than it was ten years ago, and an independent enquiry indicates that there, at least, the number of persons working as saltpetre refiners approximates more nearly to the figures of the last Census than to those now returned. The persons who follow this employment are usually partially agriculturists, and it is possible that the change of system in tabulating occupations combined with agriculture is responsible for the apparent decline under this head."

The following is a list of the 55 Industries for which charts have been prepared, with the number of persons supported by each in 1901:—

Serial No.	Name of Industry.	Persons supported by each Industry.	Serial No.	Name of Industry.	Persons supported by each Industry.
1	Cotton	5,780,000	29	EMBROIDERY AND CARPET	94,000
2	Fish	2,320,000	30	Printed matter	88,000
3	Leather	2,100,000	31	Spangle and Bead	87,500
4	Wood	2,025,000	32	Cocoon	78,500
5	Pottery	1,555,000	33	Chemical	67,000
6	Vegetable oil	1,540,000	34	Forest produce	62,800
7	JEWELLERY	1,320,000	35	Flour and Rice	58,800
8	Iron	1,235,000	36	Gold wire	51,800
9	Cane	1,175,000	37	Ship and Boat	40,200
10	Tea and Coffee	920,000	38	Bread and Biscuit	38,800
11	Dress	915,000	39	Well	32,900
12	Milk	775,000	40	PAINT	26,800
13	Sugar	716,000	41	Explosive	24,500
14	Masonry	636,000	42	Instrument	21,800
15	Metal	454,000	43	Paper	13,900
16	Fibre	433,000	44	Indigo	13,600
17	Dye	373,000	45	Mineral oil	11,400
18	Tobacco	319,000	46	Umbrella	10,300
19	Silk	276,000	47	Match	8,375
20	Building materials	237,000	48	Aerated waters	8,350
21	Salt	202,000	49	PHOTOGRAPH	3,375
22	Wool	183,000	50	Tent	2,925
23	ARTISTIC GOODS	165,000	51	Ice	2,700
24	STONE	160,100	52	Pearl	2,225
25	Glass	155,000	53	Gas	1,390
26	Mineral	133,500	54	Beer	730
27	Drugs and Perfume	108,500	55	Manure	720
28	Spirit	108,000			

The artisans that have been included in each of the above industries will be found described on pages 31, 35, 39, 43, 47, 51, 55, 59, 63, 67, 71, 75, and 79 in the words of the *group* headings of Table XV (Occupation) of the 1901 Census; the figures on the left of each heading are the Census table *group* numbers.

The fostering of Industries.

Industries can best be fostered by training the worker in a suitable manner, but considerations of economy render it imperative that effort be concentrated on those industries which are most likely to divert the greatest number of workers from agriculture and which will cause the most rapid accumulation of capital. In attempts hitherto made to assist industries this principle has frequently been disregarded, the great industries which have much influence on the wealth of India have been neglected for minor industries which have a more attractive appearance, generally the art industries.

Art Industries.

The six industries which have been printed in capitals in the above list include the majority of the art-workers. These suppliers of luxuries contribute little to the material prosperity of the country, their well-being depends mainly on that of the whole population, the encouragement of the export trade (principally carpets) will benefit so small a number of workers that expenditure on this objet can only be recommended on other than utilitarian grounds.

There is much room for improvement of *form*, *design*, and *finish* in Indian art-work. "*Night*"-schools, the establishment of which has been recommended in the Report, conducted by suitably trained teachers, and the spread of instruction in drawing in the elementary schools will supply the art-worker's first want, assistance in improving his designs. In this connection special attention is invited to the chapter on "Drawing" in the Report on Practical and Technical Education by Sir E. C. Buck, Kt., K.C.S.I. This chapter has been reprinted as Appendix X to this Report, it will be found on page 125.

The art-worker's next greatest wants are a ready sale for his goods and advances in cash. The organization of these aids seems to offer a suitable scope for the efforts of Societies of patriotic gentlemen desirous of developing the Industries of India. They would—

(i) Organize sale rooms in public thoroughfares, hotels, and railway stations.
(ii) Compile illustrated catalogues.
(iii) Advertise.
(iv) Register orders and receive advance payments.
(v) Make advances to craftsmen.
(vi) Organize a system of supervision of the craftsmen through the local gentry or guilds, in order to safeguard the advances made to the craftsmen and to secure promptness in the execution of work.
(vii) Guarantee the quality and finish of each article.
(viii) Forward the finished article to the purchaser.

It may be noted that the recommendations made in 1895, at the Lahore Conference on Art Schools, for facilitating the sale of Art Wares through the medium of sale rooms in Museums and the registration of craftsmen, appear not to have found favour in Bombay and Madras. They have been adopted with, it is understood, very moderate success in Calcutta and Lahore. The want of success appears to be due to the lack of organization and funds.

The Great Industries.

If judged solely by the criterion "*number of persons supported*" the industries at the head of the above list are undoubtedly the Great Indian Industries, but due weight should also be given to the second criterion "*volume of trade*" which is indicated by the figures in the last column of the charts. A consideration of both criteria leads to the suggestion that after eliminating the six art-industries the remaining forty-nine should be arranged in the following order of importance :—

1. Cotton.
2. Vegetable oil.
3. Leather.
4. Iron.
5. Fish.
6. Wood.
7. Fibre.
8. Pottery.
9. Sugar.
10. Cane.
11. Dress.
12. Tea and Coffee.
13. Milk.
14. Mineral.
15. Masonry.
16. Silk.
17. Wool.
18. Metal.
19. Dye.
20. Flour and Rice.
21. Tobacco.
22. Mineral oil.
23. Salt.
24. Forest produce.
25. Building materials.
26. Grass.
27. Spirit.
28. Chemical.
29. Drugs and Perfume.
30. Paper.
31. Instrument.
32. Explosive
33. Printed matter.
34. Spangle and Bead.
35. Cocoon.
36. Beer.
37. Manure.
38. Gold wire.
39. Match.
40. Ship and Boat.
41. Bread and Biscuit.
42. Well.
43. Umbrella.
44. Indigo.
45. Aerated waters.
46. Tent.
47. Ice.
48. Pearl.
49. Gas.

The industries in the first column of this statement are of so great importance to India that they may be appropriately termed "Imperial."

It has probably occurred to few of those who deplore the condition of the Indian Industries that the oilman, the leather-worker, the fisherman, the potter have a first claim to such assistance as it may be possible to give.

Provincial Industries.

The industries named in the second and third columns of the above list are of less general importance, but the Wool, Metal, Dye, Tobacco, and Building-materials industries are of great importance to a majority of the provinces, and the following are of primary importance to the provinces shewn opposite to each :—

Flour and Rice	Burma.
Glass	Berar, Punjab, North-Western Provinces.
Chemical	North-Western Provinces, Bengal.
Drugs and Perfume . . .	North-Western Provinces.
Printed matter	Bengal.
Spangle and Bead . . .	North-Western Provinces.
Cocoon	Bengal.
Gold wire	Punjab.

Explanation of the Industrial Population Charts.

There is one chart for each industry, it stretches across two opposite pages, in a short note below some of the charts certain features of the industry are discussed.

The *first column* contains the serial number of the chart,

the *second column* the name of the industry ;

in the *third column* the total number of persons in British India who were dependent on the industry in 1901 is shewn in figures, below this figure are arranged a number of ○s and +s which represent that number, on the scale which will be found on each page above the column headings. The total represented by the ○s corresponds to the number as ascertained by the 1901 Census, the total represented by the +s corresponds to the number as ascertained by the 1891 Census ; +s have been printed over ○s to facilitate the comparison of the two years 1891, 1901; where there has been no change during the decade the number of +s printed over an equal number of ○s gives that number of ⊕s (the combined symbol) ; a decrease is indicated by an excess of +s above the ⊕s, an increase by an excess of ○s above the ⊕s.

In the nine columns, *4th to 12th*, the details for each province are given in a similar manner, but the width of the column for each province having been made as nearly as possible proportional to the population of that province the height of the pillar of symbols for each province is proportional to the percentage of population dependent on that industry in that province, it is an index of industrial activity ; in other words, the higher the pillar of symbols the greater the importance of the industry and THE GREATER THE FIELD FOR INDUSTRIAL INSTRUCTION.

In the *14th and 15th columns* the figures in larger type indicate the rupee value of imported articles which might be manufactured in India and of exported raw materials which should be worked up before export. These only have been totalled in the 16th column for these alone indicate where remedy is required. Imports of raw cotton, for instance (see chart No. 1) and even of cotton yarn to be worked up in India, exports of piece goods made in India are signs of activity which should be excluded from the total in column 16 which measures the extent to which the cotton industry has yet to expand. This total is reproduced below, symbolically, by means of a number of ◇s each of which represents one million rupees. Each horizontal line in this column contains fifteen ◇s, it therefore represents one million pounds sterling of important exports and imports.

1.—COTTON.

263. Cotton ginning, cleaning, and pressing mills: owners, managers, and superior staff.
264. Cotton ginning, cleaning, and pressing mills: operatives and other subordinates.
265. Thread glazing and polishing factories: owners, managers, and superior staff.
266. Thread glazing and polishing factories: operatives and other subordinates.
267. Cotton spinning, weaving, and other mills: owners, managers, and superior staff.
268. Cotton spinning, weaving, and other mills: operatives and other subordinates.
271. Cotton cleaners, pressers, and ginners.
272. Cotton weavers: hand industry.
275. Cotton spinners.
276. Cotton yarn and thread sellers.
279. Tape-makers.
280. Tape-sellers.

2.—FISH.

79. Fishermen and fish curers.
80. Fish-dealers.

3.—LEATHER.

222. Harness (not leather) makers and sellers.
224. Whip, goad, and walking stick, etc., makers.
384. Tanneries and leather factories: owners, managers, and superior staff.
385. Tanneries and leather factories: operatives and other subordinates.
387. Shoe, boot, and sandal makers.
388. Tanners and curriers.
389. Sellers of manufactured leather goods.
390. Sellers of hides, horns, bristles, and bones.
391. Water bag, well bag, bucket, and *ghi* pot makers.

Each + represents 10,000 persons in 1891, each ○

Serial Number.	Name of Industry.(a)	Total Persons supported by each Industry in British India.(b)	Details for Berar.(c)	Assam.(d)	Central Provinces.(e)	Burma.(f)	Bombay.(g)	Punjab.(h)	Madras.(i)
1	COTTON	5,780,000	60,000	60,000	380,000	250,000	530,000	1,020,000	1,220,000
2	FISH	2,320,000	10,000	160,000	100,000	200,000	190,000	10,000	390,000
3	LEATHER	2,100,000	20,000	10,000	100,000	10,000	190,000	660,000	470,000

The extent to which the cotton-mill industry has expanded is shown in the commercial statistics published by number of workers from 112,000 to 156,000, in 1901 the total number of persons dependent on earnings in cotton-mills from the hand to the mill industry and 740,000 to other occupations. The magnitude of

It is difficult to account for the reduction in the number of fishermen, fish-curers, and fish-dealers. The explanation may for whilst in 1901 the number of fish-dealers slightly exceeded that of fishermen, in 1891 the latter were returned as being waters. The exemption from duty of salt used for curing purposes would

The increased indigenous demand for shoes has caused this industry to expand but the very large exports of raw hides development. The processes whereby hides are converted into good leather require the constant attention of expert chemists that the leather industry of India will receive that assistance from highly trained scientific experts which it so urgently needs of rupees (£7,650,000). The greater part of these exports were in the raw state worth Rs. 48 per cwt. Only Southern value of exported hides would have exceeded 18 crores of rupees (£12,000,000). Imported leather is worth on an averag value of the present exports without adding t

(a) See back of this page.
(b) In round numbers the population of British India is 232 millions.
(c) " " " of Berar is 3 millions.
(d) In round numbers the population of Assam is 6 millions.
(e) " " " of the Central Provinces is 10 million
(f) " " " of Burma is 10 millions.

10,000 persons in 1901, each ◇ Rs. 10,00,000.

each Province.

North-West Provinces.(*j*)	Bengal.(*k*)	Name of Article.	Imports (00,000 omitted.) Rs.	Exports Rs.	Total of Important Exports and Imports. (Each line of ◇ = £1,000,000 sterling.)
1,240,000	1,020,000	Raw cotton .	20	14,43	Rs. 54,08,00,000
		Cotton yarn	2,65	9,32	◇
		Piece-goods .	30,33	1,55	◇◇◇◇◇◇◇◇◇◇◇◇◇◇

the Government of India, during the 10 years ending in 1901 the number of mills has increased from 125 to 190 and the was 291,000. It may be inferred from these figures that during the period in question about 82,000 persons have passed the imports of cotton goods and of the export of cotton yarn and raw cotton is significant.

50,000	1,210,000	Dried fish .	36	24	Rs. 44,00,000
		Animal oil .	4	...	
		Shells .	4	...	
					◇◇◇◇

be found in Assam where the loss has been greatest. The accuracy of the Assam figures is indeed open to grave suspicion, almost three times as numerous as the former. The greater part of the imported fish is caught in Malaccan and Arabian probably lead to the creation of a considerable fish-curing industry.

330,000	310,000	Raw hides .	11	5,58	Rs. 9,10,00,000
		Tanning materials.	4	48	
		Cured hides	7	2,65	◇
		Leather .	4	1	◇◇◇◇◇◇◇◇◇◇◇◇◇◇
		Leather articles.	35	6	◇◇◇◇◇◇◇◇◇◇◇◇◇◇

cured hides, and tanning materials instead of leather goods and finished leather shew that the industry is in great need of the Indian Universities give but small encouragement to chemical research, unless this defect be remedied there is little hope During the financial year 1900-1, 1,943,000 cwts. of raw and cured hides and skins were exported valued at 11½ crores India exported cured hides worth Rs. 96 per cwt.; had Northern India followed the excellent example set by the south the total half as much again as cured hides, a complete development of the leather industry would therefore at least double the the number of hides that leave the country.

(*g*) In round numbers the population of Bombay is 19 millions.
(*h*) ,, ,, ,, of the Punjab is 22 millions.
(*i*) ,, ,, ,, of Madras is 39 millions.
(*j*) In round numbers the population of the N.-W. Provinces is 48 millions.
(*k*) ,, ,, ,, of Bengal is 75 millions.

4.—WOOD.

169. Coach building factories: owners, managers, and superior staff.
170. Coach building factories: operatives and other subordinates.
171. Cart and carriage makers.
172. Cart and carriage sellers.
174. Palki, dandi, rickshaw makers and sellers.
218. Furniture factories: owners, managers, and superior staff.
219. Furniture factories: operatives and other subordinates.
220. Furniture makers: hand industry.
221. Furniture sellers.
230. Plough and agricultural implement makers.
231. Looms and loom-comb makers and sellers.
241. Gun carriage factories: managers and superior staff.
242. Gun carriage factories: workmen and other subordinates.
340. Carpentry works: owners, managers, and superior staff.
341. Carpentry works: operatives and other subordinates.
342. Saw mills: owners, managers, and superior staff.
343. Saw mills: workmen and other subordinates.
344. Carpenters.
346. Wood cutters and sawyers.

5.—POTTERY.

334. Pottery works: owners, managers, and superior staff.
335. Pottery works: operatives and other subordinates.
336. Potters and pot and pipe-bowl makers.
337. Sellers of pottery ware.

6.—VEGETABLE OIL.

89. Oil mills: owners, managers, and superior staff.
90. Oil mills: operatives and other subordinates.
100. Oil pressers.
101. Oil sellers.
143. Pressers of vegetable oil for lighting.
144. Sellers of vegetable oil for lighting.

7.—JEWELLERY.

212. Imitation and pewter jewellery makers.
213. Sellers of imitation and pewter jewellery.
313. Enamellers.
314. Electro-platers.
317. Workers in gold, silver, and precious stones.
318. Dealers in gold, silver, and precious stones.

Each + represents 5,000 persons in 1891, each ○

Serial Number.	Name of Industry.(a)	Total Persons supported by each Industry in British India.(b)	Details for Berar.(c)	Assam.(d)	Central Provinces.(e)	Burma.(f)	Bombay.(g)	Punjab.(h)	Madras.(i)
4	WOOD	2,025,000	25,000	20,000	55,000	155,000	205,000	385,000	375,000
		All branches of the wood industry contribute to the decline. Employers of labour							
5	POTTERY	1,555,000	15,000	20,000	50,000	25,000	105,000	255,000	205,000
		See the proposals for an Institute of Experiment in							
6	VEGE-TABLE OIL.	1,540,000	10,000	10,000	85,000	35,000	95,000	110,000	165,000
		The protective tariffs which favour the export of oil seeds for expression in Europe are probably a great obstacle to seed that of oil. It should be remembered that the plant obtains from the atmosphere the constituents of the oil, the oil soil as manure after having, as cattle food							
7	JEWEL-LERY.	1,320,000	20,000	15,000	60,000	55,000	145,000	130,000	310,000
		Attention is invited to the small decrease in provinces which have ?							

(a) See back of this page.
(b) In round numbers the population of British India is 232 millions.
(c) " " " of Berar is 3 millions.
(d) In round numbers the population of Assam is 6 millions.
(e) " " " " of the Central Provinces is 10 millions.
(f) " " " of Burma is 10 millions.

5,000 persons in 1901, each ◇ Rs. 10,00,000.

each Province.

North-West Provinces.(*j*)	Bengal.(*k*)	Name of Article.	Imports (00,000 omitted.) Rs.	Exports Rs.	Total of Important Exports and Imports. (Each line of ◇ = £1,000,000 sterling.)
430,000	375,000	Carriages .	31	...	Rs. 70,00,000
		Games requisites, and Toys.	20	4	
		Tea chests .	10	...	
		Furniture .	9	4	
		Also see "34.—Forest Produce" for imports and exports of timber.			

in industrial centres complain greatly of the want of suitably trained workers in wood.

430,000	450,000	Earthenware and porcelain.	26	...	Rs. 26,00,000

the Pottery and China-ware Industries on page 21.

550,000	480,000	Oil seeds .	9	16,63	Rs. 16,96,00,000
		Oil . .	33	53	
		Oil cake .	...	30	

the development of the oil-pressing industry in India, no effort should nevertheless be spared to substitute for the export of cake (the residuum after expression of the oil) contains what the plant has taken out of the soil, this should be returned to the assisted in the production of milk, butter, ghi.

245,000	340,000	Stone and pearls.	1,11	2	Rs. 18,00,000
		Jadestone .	...	4	
		Coral .	8	...	
		Jewellery .	14	3	

suffered from famine and to the increase in Burma and Madras.

(*g*) In round numbers the population of Bombay is 19 millions.
(*h*) „ „ „ of the Punjab is 22 millions.
(*i*) „ „ „ of Madras is 39 millions.
(*j*) In round numbers the population of the N.-W. Provinces is 48 millions.
(*k*) „ „ „ of Bengal is 75 millions.

8.—IRON.

167. Railway and tramway factories: owners, managers, and superior staff.
168. Railway and tramway factories: operatives and other subordinates.
225. Machinery and engineering workshops: owners, managers, and superior staff.
226. Machinery and engineering workshops: operatives and other subordinates.
227. Knife and tool makers.
228. Knife and tool sellers.
229. Knife and tool grinders.
232. Mechanics other than railway mechanics.
233 Machinery dealers, etc.
234. Sugar press makers.
237. Arsenals: superior staff.
238. Arsenals: operatives and other subordinates.
243. Gun makers, menders, and sellers.
246. Makers of swords, spears, and other weapons.
247. Sellers of swords, spears, and other weapons.
326. Iron foundries: owners, managers, and superior staff.
327. Iron foundries: operatives and other subordinates.
328. Workers in iron and hardware.
329. Sellers of iron and hardware.

9.—CANE.

202. Toy, kite, and cage makers and sellers.
203. Hukka-stem makers and sellers.
345. Dealers in timber and bamboos.
347. Basket, mat, fan, screen, broom, etc., makers and sellers.
348. Comb and tooth-stick makers and sellers.
349. Leaf-plate makers and sellers.
382. Brush factories: owners, managers, and superior staff.
383. Brush factories: operatives and other subordinates.

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10.—TEA AND COFFEE.

41. Cinchona plantations: owners, managers, and superior staff.
42. Cinchona plantations: labourers and other subordinates.
43. Coffee plantations: owners, managers, and superior staff.
44. Coffee plantations: labourers and other subordinates.
47. Tea plantations: owners, managers, and superior staff.
48. Tea plantations: labourers and other subordinates.

11.—DRESS.

296. Hosiery factories: owners, managers, and superior staff.
297. Hosiery factories: operatives and other subordinates.
302. Hat, cap, and turban makers, binders, and sellers.
303. Hosiers and haberdashers.
305. Makers of shoes (not leather).
306. Tailors, milliners, dressmakers, and darners.

12.—MILK.

77. Cheese makers and sellers.
78. Cow and buffalo keepers and milk and butter sellers.
82. *Ghi* preparers and sellers.

Each + represents 5,000 persons in 1891, each ○

Serial Number.	Name of Industry.(a)	Total Persons supported by each Industry in British India.(b)	Details for Berar.(c)	Assam.(d)	Central Provinces.(e)	Burma.(f)	Bombay.(g)	Punjab.(h)	Madras.(i)
8	IRON	1,235,000	10,000	15,000	85,000	35,000	115,000	165,000	180,000
	The number of hardware dealers has kept pace with the increasing imports; blacksmiths, knife and tool makers, sword iron founders have increased. Also see the proposals for an								
9	CANE	1,175,000	15,000	15,000	70,000	70,000	95,000	120,000	250,000
	A comparison of Indian bamboo and cane-work with that made in China,								
10	TEA AND COFFEE.	920,000	...	630,000	...	20,000	...	5,000	50,000
	The workers in the three industries, Chincona, Coffee, Tea, were enumerated under								
11	DRESS	915,000	10,000	10,000	40,000	75,000	90,000	105,000	75,000
12	MILK	775,000	5,000	15,000	35,000	10,000	60,000	45,000	60,000
	There is much scope for the development								

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(b) In round numbers the population of British India is 232 millions.
(c) „ „ „ of Berar is 3 millions.
(d) In round numbers the population of Assam is 6 millions.
(e) „ „ „ of the Central Provinces is 10 millions.
(f) „ „ „ of Burma is 10 millions.

5,000 persons in 1901, each ◇ Rs. 10,00,000.

each Province.

North-West Provinces.(*j*)	Bengal (*k*)	Name of Article.	Imports (00,000 omitted.) Rs.	Exports Rs.	Total of Important Exports and Imports. (Each line of ◇ = £1,000,000 sterling.)
350,000	280,000	Railway plant.	5,09	2	Rs. 13,49,00,000
		Machinery .	3,22	...	
		Hardware .	2,15	3	
		Parts of ships.	48	...	
		Steel .	2,11	...	
		Firearms .	44	...	
		Also see "26.—Minerals."			

and spear forgers, gunsmiths have decreased; knife and tool grinders, sugar press makers, mechanics of all sorts and Institute of Experiment in the Metal Industries on page 21.

165,000	375,000	Cane, bristles	3	14	Rs. 19,00,000
		Matting .	2	2	
		Sticks, whips	3	...	

Japan, and in other countries shows that experiment and instruction are needed.

...	215,000	Coffee .	2	125	Rs. 87,00,000
		Tea . .	16	815	
		Spices .	85	74	

one head in 1891, it is, therefore, impossible to discuss their respective development.

325,00	185,000	Wearing apparel.	1,56	21	Rs. 1,56,00,000
		Feathers .	...	2	
115,000	430,000	Ghi . .	4	21	Rs. 19,00,000
		Butter .	3	...	
		Cheese .	5	...	
		Bacon, Ham	7	...	

of the dairy industry especially in Bengal.

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(*k*) " " " of Bengal is 75 millions.

13.—SUGAR.

93. Sugar factories: owners, managers, and superior staff.
94. Sugar factories: operatives and other subordinates.
99. Makers of sugar, molasses, and *gur* by hand.
131. Toddy drawers.
132. Toddy sellers.

14.—MASONRY.

163. Masons and builders.

15.—METAL.

320. Brass foundries: owners, managers, and superior staff.
321. Brass foundries: operatives and other subordinates.
322. Brass, copper, and bell-metal workers.
323. Brass, copper, and bell-metal sellers.
324. Workers in tin, zinc, and quicksilver and lead.
325. Sellers in tin, zinc, and lead goods.

16.—FIBRE.

283. Jute presses: owners, managers, and superior staff.
284. Jute presses: operatives and other subordinates.
285. Jute mills: owners, managers, and superior staff.
286. Jute mills: operatives and other subordinates.
287. Rope works: owners, managers, and superior staff.
288. Rope works: operatives and other subordinates.
289. Dealers in raw fibres.
290. Rope, sacking, and net makers.
291. Rope, sacking, and net sellers.
292. Fibre matting and bag makers.
293. Fibre matting and bag sellers.

Each + represents 2,000 persons in 1891, each ○

Serial Number.	Name of Industry.(a)	Total Persons supported by each Industry in British India.(b)	Details for Berar.(c)	Assam.(d)	Central Provinces.(e)	Burma.(f)	Bombay.(g)	Punjab.(h)	Madras.(i)
13	SUGAR	716,000	...	...	4,000	94,000	16,000	8,000	386,000
		The industry is							
14	MASONRY	636,000	6,000	4,000	22,000	10,000	74,000	96,000	206,000
15	METAL	454,000	4,000	6,000	18,000	10,000	130,000	30,000	70,000
		The increase is fairly evenly distributed between the various classes of workers in the softer metals.							
16	FIBRE	438,000	2,000	...	6,000	10,000	54,000	32,000	84,000
		The jute mills contribute 32,000 to the increase, jute balers and dealers 25,000 more, workers in hemp, grass, probability that this industry							

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(b) In round numbers the population of British India is 232 millions.
(c) " " " of Berar is 3 millions.
(d) In round numbers the population of Assam is 6 millions.
(e) " " " of the Central Provinces is 10 millions.
(f) " " " of Burma is 10 millions.

2,000 persons in 1901, each ◇ Rs. 10,00,000.

each Province.

North-West Provinces.(*j*)	Bengal.(*k*)	Name of Article.	Imports (00,000 omitted). Rs.	Exports Rs.	Total of Important Exports and Imports. (Each line of ◇ = £1,000,000 sterling.)
80,000	128,000	Raw Sugar	...	7	Rs. 5,92,00,000
		Refined Sugar.	585	2	
⊕⊕⊕⊕⊕⊕⊕⊕++	+++++ ⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕+++++++++++				◇◇◇◇◇◇◇◇◇◇◇◇◇
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steadily declining.

88,000	130,000				
⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕+++	○○○○○○○○○○○○○○				
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68,000	118,000	See "26.—Minerals."			
⊕○	⊕⊕⊕⊕⊕⊕⊕⊕+++++++				
⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕	⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕				
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Also see the proposals for an Institute of Experiment in the Metal Industries on page 21.

36,000	214,000	Raw Jute .	...	11,8	Rs. 12,62,00,000.
		„ Hemp.	3	38	
		„ Coir .	...	2	
		Jute goods.	9	865	
		Hemp „	1	...	◇◇◇◇◇◇
		Coir „	...	38	◇◇◇◇◇◇◇◇◇◇◇◇◇◇◇
	○○○○○○○	Flax „	26	...	◇◇◇◇◇◇◇◇◇◇◇◇◇◇◇
	○○○○○○○○○○○○○○○○○○○○○○○	Cordage .	6	7	◇◇◇◇◇◇◇◇◇◇◇◇◇◇◇
⊕⊕+++++	⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕				◇◇◇◇◇◇◇◇◇◇◇◇◇◇◇
⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕	⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕				◇◇◇◇◇◇◇◇◇◇◇◇◇◇◇

cocoanut fibre, flax, account for the remainder of the increase. The export of raw fibre is so large that there seems to be a will continue to expand.

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(*k*) „ „ „ of Bengal is 75 millions.

17.—DYE.

253. Wool dyers.
262. Silk dyers.
277. Calenderers, fullers, and printers.
278. Cotton dyers.
367. Dye works: owners, managers, and superior staff.
368. Dye works: operatives and other subordinates.
374. Madder, saffron, and logwood workers and dealers.
379. Persons occupied with miscellaneous dyes.
386. Leather dyers.

18.—TOBACCO.

119. Tobacco factories: owners, managers, and superior staff.
120. Tobacco factories: workmen and other subordinates.
129. Tobacco and snuff manufacturers.
130. Tobacco and snuff sellers.

19.—SILK.

255. Silk filatures: owners, managers, and superior staff.
256. Silk filatures: operatives and other subordinates.
257. Silk mills: owners, managers, and superior staff.
258. Silk mills: operatives and other subordinates.
260. Silk carders, spinners, and weavers, makers of silk braid and thread.
261. Sellers of raw silk, silk cloth, braid, and thread.

20.—BUILDING MATERIALS.

151. Brick and tile factories: owners, managers, and superior staff.
152. Brick and tile factories: operatives and other subordinates.
155. Brick and tile makers.
156. Brick and tile sellers.
157. Lime, chunam, and shell burners.
158. Lime, chunam, and shell sellers.
160. Cement works: owners, managers, and superior staff.
161. Cement works: operatives and subordinates.

Each + represents 1,000 persons in 1891, each O

Serial Number.	Name of Industry. (a)	Total Persons supported by each Industry in British India. (b)	Details for Berar. (c)	Assam. (d)	Central Provinces. (e)	Burma. (f)	Bombay. (g)	Punjab. (h)	Madras. (i)
17	DYE	373,000	8,000	...	13,000	7,000	57,000	119,000	47,000
18	TOBACCO	319,000	2,000	2,000	11,000	70,000	25,000	9,000	74,000
19	SILK	276,000	1,000	2,000	23,000	39,000	55,000	22,000	61,000
20	BUILDING MATERIALS.	237,000	4,000	3,000	11,000	12,000	45,000	34,000	55,000

Wood, silk, and leather dyers, persons occupied with all manner of dyes, have become much more numerous, but not not include Indigo makers; these will be

The increase among workers in dyes is the more remarkable in that it has been very generally believed

Imports of cigarettes have been increasing rapidly and imports of cigars have been decreasing, exports of Indian cigars imported cigars and cigarettes as all the other Indian ports, these

The large increase and the large imports give promise of a great development of this industry which is still almost 20,000 (also compare heading "32.—Cocoon" and

There has been a decrease of lime burners amounting to about 8 per cent., but Brick and Tile makers have increased by The imports consist mainly of cement,

Glazed tiles are very expensive in India, they are only made by a few private firms who have a monopoly of the Italy they are made everywhere

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1,000 persons in 1901, each ◇ Rs. 10,00,000.

each Province.

North-West Provinces.(*f*)	Bengal.(*k*)	Name of Article.	Imports (00,000 omitted.) Rs.	Exports (00,000 omitted.) Rs.	Total of Important Exports and Imports. (Each line of ◇ = £1,000,000 sterling.)
104,000	18,000	Aniline, Saffron and Cochineal .	75	...	Rs.75 00.000
		Indigo .	...	185	
		Safflower, Turmeric .	...	10	
○○○○○○○○ ⊕⊕⊕⊕⊕⊕⊕⊕○○○○○○○○ ⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕ ⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕ ⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕ ⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕	+++++++++++++++ ⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕+++++++				◇◇◇◇◇◇◇

sufficiently so to fully compensate the loss of about 91,000 cotton dyers, calenderers, fullers, and printers. These figures do found below under heading "44.—Indigo."
that the large imports of dye stuffs was destroying the dyeing industry (also see the remarks on page 23).

56,000	70,000	Raw tobacco	...	18	Rs. 63,00,000
		Manufactured tobacco	45	17	
+++++ ⊕⊕⊕⊕⊕⊕⊕⊕+++++++ ⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕ ⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕ ⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕	+++++ +++++++++++++++++++++++ ⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕+++++ ⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕ ⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕				◇◇◇◇◇◇

have been increasing. Bengal ports which supply Bengal and the North-West Provinces admit about 2½ times as much of the provinces also shew the greatest loss of tobacco manufacturers and sellers.

13,000	60,000	Raw Silk .	81	66	Rs. 2,95,00,000
		Silk goods .	148	11	
⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕++	○○○○○○○○○○ ⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕○○○○○ ⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕				◇◇◇◇◇◇◇◇◇◇◇◇◇◇◇◇ ◇◇◇◇◇◇◇◇◇◇◇◇◇◇◇◇

entirely in the hands of the cottager; silk mills give employment to little more than 4,000 persons and filatures to less than
the remarks on sericulture on pages 22 and 23).

14,000	59,000	Building Materials .	23	...	Rs. 23,00,000
+++++++ ⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕++	○○○○○○○○○ ⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕○○○○○○○○ ⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕				◇◇

almost 50 per cent. and cement making, apparently a new industry, employs over 2,000 persons (compare "14—Masonry").
brick, tiles, and earthernware piping.
trade. Brickburners should be taught how to make cheap glazed tile for floors, they are well suited to the climate; in Southern
and are used in quite poor houses.

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(*f*) In round numbers the population of the N.-W. Provinces is 48 millions.
(*k*) " " " of Bengal is 75 millions.

21.—SALT.

117. Salt stores: owners, managers, and superior staff.
118. Salt stores: workmen and other subordinates.
127. Salt makers.
128. Salt sellers.

22.—WOOL.

249. Shawl weavers.
250. Felt and pashm workers.
251. Persons occupied with blankets, woollen cloth and yarn, fur, feathers, and natural wool.
252. Wool carders.
254. Dealers in woollen goods, fur, and feathers.

23.—ARTISTIC GOODS.

194. Wood and ebony carvers.
195. Ivory carvers.
196. Cotton stamp makers and sellers.
197. Turners and lacquerers.
198. Die sinkers and seal, etc., engravers.
201. Mosaic and alabaster workers and sellers.
204. Papier-maché workers and sellers.
208. Makers of bangles other than glass.
209. Sellers of bangles other than glass.
483. Painters, superintendents of Schools of Art, etc.
484. Sculptors.

Each + represents 500 persons in 1891, each ○

Serial Number.	Name of Industry. (a)	Total Persons supported by each Industry in British India. (b)	Details for Berar. (c)	Assam. (d)	Central Provinces. (e)	Burma. (f)	Bombay. (g)	Punjab. (h)	Madras. (i)
21	SALT	202,000	500	2,500	35,000	13,500	8,500	16,000	56,500
		This industry is entirely under							
22	WOOL	183,000	2,500	...	14,500	500	40,500	31,500	28,500
		The loss of workers, the large imports of manufactured goods, and exports of the raw material seem to indicate the produce woollen goods, they do not seem to be developing							
23	ARTISTIC GOODS.	165,000	500	...	4,500	21,000	11,500	13,500	26,000
		Makers of lac, wood, shell, bone, and clay bangles, mosaic and alabaster workers, cotton-stamp makers, have each lost increased in numbers. The increase in turners and lacquerers is especially large (over 8,000 or about 42 per cent.), the from 22,000 to							

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(b) In round numbers the population of British India is 232 millions.
(c) „ „ of Berar is 3 millions.
(d) In round numbers the population of Assam is 6 millions.
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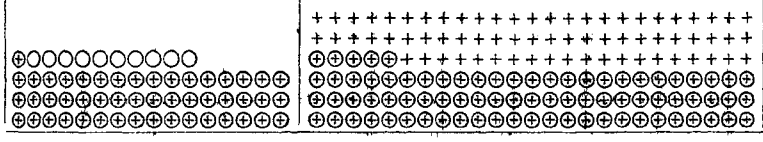
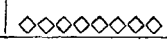
(f) „ „ „ of Burma is 10 millions.

500 persons in 1901, each ◇ Rs. 10,00,000.

each Province.

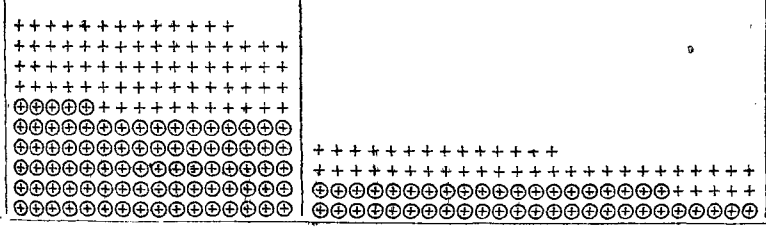
North-West Provinces. (*j*)	Bengal. (*k*)	Name of Article.	Imports (00,000 omitted.) Rs.	Exports Rs.	Total of Important Exports and Imports. (Each line of ◇ = £1,000,000 sterling.)
29,500	40,000	Salt . .	78	...	Rs. 78,00,000





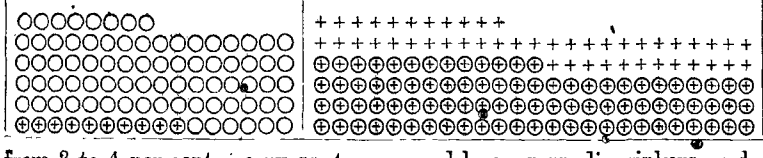
the control of Government.

42,500	22,500	Raw wool .	11	79	Rs. 2,84,00,000
		Woollen goods	2,05	2	



necessity of making detailed enquiry into the condition of this industry and the possibility of reviving it. Only four mills as rapidly as the cotton, jute, and paper mills.

44,000	44,000	Works of art	3	...	
		Chinese and Japanese ware.	2	...	
		Raw Ivory .	15	...	
		Ivory articles	2	...	



from 3 to 4 per cent.; carvers, turners and lacquerers, die sinkers and engravers, papier-maché workers and sculptors have absence of any considerable export of these goods seems to indicate an increased indigenous demand. Painters have decreased less than 13,000.

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(*j*) In round numbers the population of the N.-W. Provinces is 48 millions.
(*k*) „ „ „ of Bengal is 75 millions.

24.—STONE.

153. Stone and marble works: managers and superior staff.
154. Stone and marble works: labourers and other subordinates.
166. Stone and marble workers.
338. Grind-stone and mill-stone makers and menders.
339. Grind-stone and mill-stone sellers.

25.—GLASS.

210. Makers of glass bangles.
211. Sellers of glass bangles.
330. Glass factories: owners, managers, and superior staff.
331. Glass factories: operatives and other subordinates.
332. Makers of glass and china-ware other than bangles.

26.—MINERAL.

146. Collieries: owners, managers, and, superior staff.
147. Collieries: miners and other subordinates.
309. Gold mines: owners, managers, and superior staff.
310. Gold mines: operatives and other subordinates.
311. Jade miners.
481. Metallurgists.
503. Miners (unspecified).

27.—DRUGS AND PERFUME.

369. Chemists and Druggists.
376. Perfume, incense, and sandal-wood preparers.
377. Perfume, incense, and sandal-wood sellers.
378. Persons occupied with miscellaneous drugs.

Each + represents 500 persons in 1891, each O

Serial Number.	Name of Industry.(a)	Total Persons supported by each Industry in British India.(b)	Details for Berar.(c)	Assam.(d)	Central Provinces.(e)	Burma. (f)	Bombay. (g)	Punjab. (h)	Madras. (i)
24	STONE	160,000	5,500	...	8,000	8,000	35,000	3,500	74,500
	There has been a loss of mill-stone makers but a much larger gain to stone and marble workers, resulting in a net increase								
25	GLASS	155,000	5,000	...	10,500	1,000	23,000	13,000	18,000
	The decrease is confined to the glass bangle makers; other workers in glass have become more numerous. The imports also refer back to the proposals for an Institute of								
26	MINERAL.	133,500	...	2,000	6,500	1,500	16,500	11,000	12,500
	There have been large additions to the ranks of all miners excepting								
27	DRUGS AND PERFUME.	108,500	2,000	...	2,500	6,000	9,000	8,000	16,500
	In view of the violent fluctuations in the Punjab and United Provinces figures, it is not safe to place much reliance in unexplored field of research in connection with the Indian drugs. The Imports are considerable, the export of								

(a) See back of this page.
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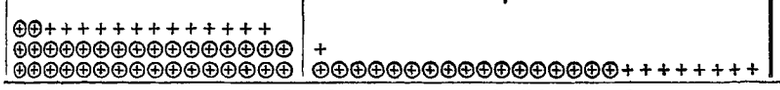
(e) " " " of the Central Provinces is 10 millions.
(f) " " " of Burma 10 millions.

500 persons in 1901 each ◇ Rs. 10,00,000.

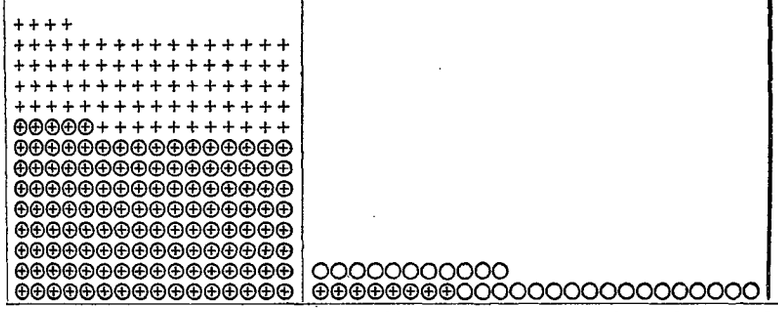
each Province.

North-West Provinces. (j)	Bengal. (k)	Name of Article.	Imports (00,000 omitted.) Rs.	Exports Rs.	Total of Important Exports and Imports. (Each line of ◇ = £1,000,000 sterling.)
17,000	8,500	Marble and Stone	3	1	



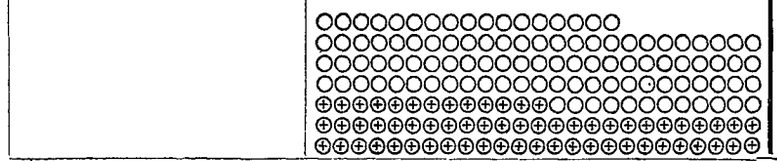
which corresponds to the development of the building trades. (Compare "14.—Masonry" and "20.—Building Materials.")

66,500	18,000	Glass ware .	95	...	Rs. 95,00,000



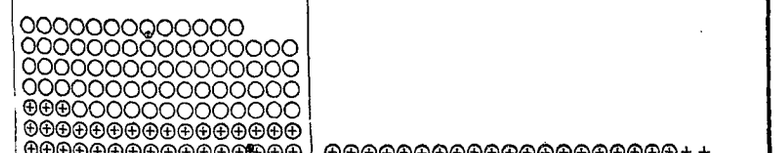
of glassware are large. A considerable portion consists of beads and false pearls. (Compare "31.—Spangle and Bead" and Experiment in the Glass Industry on page 22.)

...	83,500	Coal . .	58	57	Rs. 6,29,00,000
		Mica . .	...	11	
		Manganese ore.	...	14	
		Iron, wrought and unmanufactured.	328	1	
		Quick silver	5	...	
		Copper, wrought and unmanufactured.	138	5	
		Tin, unwrought.	23	...	
		Lead, wrought and unwrought.	32	...	
		Zinc sheet, unwrought.	15	...	
		Brass sheet .	11	3	◇◇◇
		Miscellaneous metal unwrought.	5	...	



gold miners. Attention is invited to the large imports of metals.

54,500	10,000	Drugs.*	48	18	Rs. 66,00,000.
		Essential oil.	1	6	
		Perfumery.	2	1	
		Opium.	...	852	
		Essential seeds.	...	15	



*Excepting camphor for which see "44.—Forest produce."

these figures. Dr. Watt, the Economic Reporter to the Government of India, has frequently drawn attention to the vast essential seeds instead of essences affords further indication of the direction in which enquiry seems to be necessary.

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(k) „ „ „ of Bengal is 75 millions.

28.—SPIRITS.

111. Distilleries: owners, managers, and superior staff.
112. Distilleries: operatives and other subordinates.
133. Wine and spirit distillers.
134. Wine and spirit sellers.

29.—EMBROIDERY AND CARPET.

223. Saddle-cloth makers, embroiderers, and sellers.
248. Carpet weavers.
273. Cotton-carpet and rug makers.
274. Cotton-carpet and rug sellers.
301. Embroiderers and lace and muslin makers.

30.—PRINTED MATTER.

183. Printing presses: owners, managers, and superior staff.
184. Printing presses: workmen and other subordinates.
185. Hand press proprietors, lithographers, and printers.
186. Book-binders.
199. Type-founders.

31.—SPANGLE AND BEAD.

214. Rosary, bead, and necklace makers.
215. Rosary, bead, and necklace sellers.
217. Makers and sellers of spangles, lingams, and sacred threads.

32.—COCOON.

259. Silk worm rearers and cocoon gatherers.

33.—CHEMICAL.

361. Chemical factories: owners, managers, and superior staff.
362. Chemical factories: operatives and other subordinates.
365. Saltpetre refiners.
366. Saltpetre sellers.
370. Borax refiners.
371. Borax sellers.
373. Antimony preparers and sellers.
375. Ink makers and sellers.

Each + represents 500 persons in 1891, each ○

Serial Number.	Name of Industry.(a)	Total Persons supported by each Industry in British India.(b)	Details for Berar.(c)	Assam.(d)	Central Provinces.(e)	Burma.(f)	Bombay.(g)	Punjab.(h)	Madras.(i)
28	SPIRITS	108,000	3,500	3,000	14,000	3,000	10,500	2,000	20,000
29	EMBROIDERY AND CARPET.	94,000	1,000	...	1,000	500	26,500	18,500	8,500
	The cotton and wool carpet industries shew a great development,								
30	PRINTED MATTER.	88,000	...	500	2,000	3,500	13,000	7,500	18,000
31	SPANGLE AND BEAD.	87,500	2,000	1,000	2,500	3,000	3,000	1,000	7,500
	The increase in persons dealing with these articles of luxury is worthy of note.								
32	COCOON	78,500	..	...	...	...	...	...	.....
	The large imports of raw silk (to the value of Rs. 79,00,000) indicate the extent to which								
33	CHEMICAL.	67,000	...	...	500	1,000	1,000	7,000	4,500
	All branches of the chemical industry, excepting those dealing with ink and paint appear to be in a								

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(e) „ „ „ of the Central Provinces is 10 millions.
(f) „ „ „ of Burma is 10 millions.

500 persons in 1901, each ◇ Rs. 10,00,000.

each Province.		Name of Article.	Imports (00,000 omitted.)	Exports	Total of Important Exports and Imports. Each line of ◇= £1,000,000 sterling.)
North-West Provinces.(*j*)	Bengal.(*k*)		Rs.	Rs.	
23,000	29,000	Spirits.	89	...	Rs. 89,00,000
30,500	7,500	Carpets.	8	25	Rs. 8,00,000

embroiderers have also increased by about 5 per cent.

11,000	32,500	Books, maps.	39	4	
32,500	28,000		See "25.—Glass."		

Glass beads to the value of Rs. 15,00,000 were imported during the year 1900-1.

.....	78,500		See "19.—Silk."		

the cocoon rearing industry might expand if judiciously guided (also see pages 22 and 23).

18,000	35,000	Chemicals	59	38	Rs. 1,14,00,000
		Oilcloth	6	...	
		Paint	43	...	
		Printing materials	6	...	

decadent condition (compare "27.—Drugs"). The exports of saltpetre have been diminishing steadily.

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(*i*) " " " of Madras is 39 millions.
(*j*) In round numbers the population of the N.-W. Provinces is 48 millions.
(*k*) " " of Bengal is 75 millions.

34.—FOREST PRODUCE.

350. Cutch factories: owners, managers, and superior staff.
351. Cutch factories: operatives and other subordinates.
352. Lac factories: owners, managers, and superior staff.
353. Lac factories: operatives and other subordinates.
354. Camphor, gum, and India-rubber collectors.
355. Camphor, gum, and India-rubber sellers.
356. Catechu preparers.
357. Catechu sellers.
358. Lac collectors.
359. Lac sellers.
360. Wax, honey, and forest produce collectors and sellers.

35.—FLOUR AND RICE.

87. Flour mills: owners, managers, and superior staff.
88. Flour mills: operatives and other subordinates.
91. Rice mills: owners, managers, and superior staff.
92. Rice mills: operatives and other subordinates.

36.—GOLD WIRE.

316. Gold and silver wire drawers and braid makers.

37.—SHIP AND BOAT.

175. Ship wrights, boat builders, etc.

Each + represents 200 persons in 1891, each ○

Serial Number.	Name of Industry. (a)	Total Persons supported by each Industry in British India. (b)	Details for Berar. (c)	Assam. (d)	Central Provinces. (e)	Burma. (f)	Bombay. (g)	Punjab. (h)	Madras. (i)
34	FOREST PRODUCE.	62,800	200	...	6,800	5,800	3,400	800	21,800
35	FLOUR AND RICE.	58,800	...	...	...	50,800	400	1,600	2,800
36	GOLD WIRE.	51,800	...	...	2,000	400	6,200	30,800	800
37	SHIP AND BOAT.	40,200	...	1,800	...	5,800	600	200	1,200

The fluctuations under this head are considerable, the lac, catechu, wax, and honey industries have attracted more more detailed enquiry it is impossible to say whether these variations are real or apparent due to differences of classification. bolams and wax, the exports of Imports of timber have been increasing from

The number of flour mill operatives has increased from 1,360 to 4,451, a development the insignificance of which is exporting wheat

The remainder of the increase (due to the important rice-husking industry, chiefly in Rangoon) is not wholly real, 1891 and

The figures for this industry belie the reports that the gold

The contraction of this industry may be connected with

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(f) " " " of Burma is 10 millions.

200 persons in 1901, each ◇ Rs. 10,00,000.

each Province.

North-West Provinces.(*f*)	Bengal.(*k*)	Name of Article.	Imports (00,000 omitted.) Rs.	Exports Rs.	Total of Important Exports and Imports. (Each line of ◇ = £1,000,000 sterling.)
9,800	14,200	Tanning materials.*			Rs. 2,15,00,000
		Myrabolams and catechu.	...	48	* See "3.—Leather."
		Gums and resins.	14	8	
		Lac (raw) .	4	1	
		Lac (manufactured).	...	95	
		Caoutchouc .	7	6	
		Corks .	1	...	
		Wax .	...	4	
		Hay .	1	5	
		Wood .	33	89	

workers. The number of collectors and dealers in india-rubber, camphor, and gum appears to have decreased, but without
The general increase of workers would appear to be caused by a greater indigenous demand, for excepting in the case of myra-
forest produce have decreased.
year to year whilst exports have decreased.

1,400	1,800	Flour .	2	37	Rs. 3,35,00,000
		Rice in husk	...	7	
		Wheat .	...	3,26	
		Rice—bran .	...	38	
		Rice husked	...	13,85	

emphasised by the exports of wheat amounting to 33½ millions of rupees. There is probably no good reason for India
instead of flour.
inasmuch as the rice-mill population was not enumerated under this head in 1881. The number of rice mills was 54 in
299 in 1900.

11,200	400				

and silver thread makers are in a very miserable condition.

200	30,400				

the expansion of the railway and river steamer systems.

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38.—BREAD AND BISCUIT.

85. Biscuit factories: owners, managers, and superior staff.
86. Biscuit factories: operatives and other subordinates.
95. Bakers.

39.—WELL.

500. Well-sinkers.

40.—PAINT.

164. Painters, plumbers, and glaziers.
173. Painters of carriages, etc.
178. Ship and boat painters.

41.—EXPLOSIVE.

235. Arms and ammunition factories: superior staff.
236. Arms and ammunition factories: operatives and other subordinates.
239. Gunpowder factories: managers and superior staff.
240 Gunpowder factories: operatives and other subordinates.
244 Ammunition, gunpowder, and firework makers.
245. Ammunition, gunpowder, and firework sellers.

Each + represents 100 persons in 1891, each O

Serial Number.	Name of Industry. (a)	Total Persons supported by each industry in British India. (b)	Details for Berar. (c)	Assam. (d)	Central Provinces. (e)	Burma. (f)	Bombay. (g)	Punjab. (h)	Madras. (i)
38	BREAD AND BISCUIT.	38,800	100	600	800	2,300	6,500	1,000	6,600
	It has been found necessary to omit the Punjab figures for Bakers, because the figure given in the 1891 Census Table Burma, Bombay, and Bengal								
39	WELL	32,900	100	...	...	500	1,900	3,300	25,500
40	PAINT	26,800	...	...	400	2,600	5,000	1,700	5,000
41	EXPLOSIVE.	24,500	200	...	900	100	1,700	5,100	3,000

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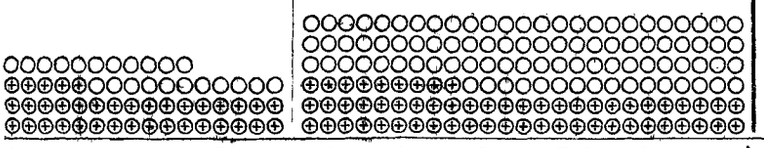
(f) " " " of Burma is 10 millions.

100 persons in 1901, each ◇ Rs. 1,00,000.

each Province.

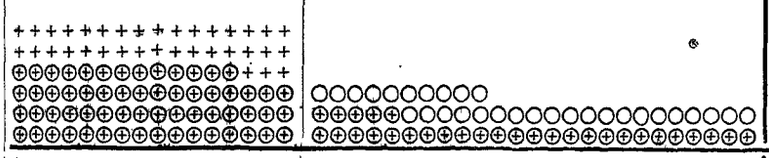
North-West Provinces. (*j*)	Bengal. (*k*)	Name of Articles.	Imports. (00,000 omitted.) Rs.	Exports. Rs.	Total of Important Exports and Imports. (Each line of ◇ = £1,000,000 sterling).
5,900	15,000	...	...	...	...



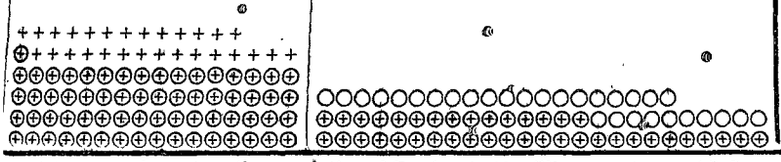
of this province (102,708) includes grain parchers. Bakers have increased by 10,060, the opening of biscuit factories in has added over 6,000.

500	1,100	...	...	...	

6,100	6,000	...	...	...	



6,500	7,000	Explosives .	67	...	Rs. 69,00,000
		Fireworks .	2	...	



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42.—INSTRUMENT.

190. Watch and clock makers.
191. Watch and clock sellers and opticians.
193. Other scientific instrument makers, menders, and sellers.
206. Music and musical instrument makers.
207. Music and musical instrument sellers.

43.—PAPER.

179. Paper mills: owners, managers, and superior staff.
180. Paper mills: operatives and subordinates.
181. Paper makers and sellers, and palm-leaf binders.

44.—INDIGO.

45. Indigo factories: owners, managers, and superior staff.
46. Indigo factories: labourers and other subordinates.

45.—MINERAL OIL.

140. Petroleum refineries: owners, managers, and superior staff.
141. Petroleum refineries: workmen and other subordinates.
363. Soap factories: owners, managers, and superior staff.
364. Soap factories: operatives and other subordinates.
372. Soap sellers.

46.—UMBRELLA.

298. Umbrella factories: owners, managers, and superior staff.
299. Umbrella factories: operatives and other subordinates.
300. Umbrella sellers.

Each + represents 100 persons in 1891, each ○

Serial Number.	Name of Industry.(a)	Total Persons supported by each industry in British India.(b)	Details for Berar.(c)	Assam.(d)	Central Provinces.(e)	Burma.(f)	Bombay.(g)	Punjab.(h)	Madras.(i)
42	INSTRUMENT.	21,800	100	...	1,600	1,500	2,500	1,900	2,100
		There has been a large decrease in the number of persons engaged in the manufacture and sale of rude musical							
43	PAPER	13,900	...	...	100	1,900	2,800	500	600
		The loss to the hand industry has been more than							
44	INDIGO	13,600	...	...	...	200	100	...	1,000
45	MINERAL OIL	11,400	...	400	...	4,000	2,300	1,900	100
		The net increase shewn is due to the development of the mineral oil industry in Burma. Workers in grease and in this trade. The soap industry							
46	UMBRELLA	10,300	...	...	...	4,000	400	100	400
		No explanation has been found for the exceptionally large number of persons returned in 1891 as makers							

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(f) " " " " of Burma is 10 millions.

100 persons in 1901, each ◇ Rs. 10,00,000.

each Province.

North-West Provinces.(*j*)	Bengal.(*k*)	Name of Article.	Imports (00,000 omitted.) Rs.	Exports Rs.	Total of Important Exports and Imports. (Each line of ◇ = £1,000,000 sterling.)
2,800	9,300	Watches .	24	...	Rs. 76,00,000
		Apparatus and musical instruments	52	...	
⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕ ⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕	+ + +

47.—MATCH.

138. Match factories: owners, managers, and superior staff.
139. Match factories: operatives and other subordinates.
145. Match, candle, torch, lamp, lantern makers and sellers.

48.—AERATED WATERS.

107. Aërated-water factories: owners, managers, and superior staff.
108. Aërated-water factories: workmen and other subordinates.

49.—PHOTOGRAPH.

485. Photographers.

50.—TENT.

176. Sail makers.
269. Tent factories: owners, managers, and superior staff.
270. Tent factories: operatives and other subordinates.
281. Tent-makers.
282. Tent-sellers.

51.—ICE.

115. Ice factories: owners, managers, and superior staff.
116. Ice factories: workmen and other subordinates.

52.—PEARL.

319. Pearl divers.

Each + represents 25 persons in 1891, each ○

Serial Number.	Name of Industry.(a)	Total persons supported by each Industry in British India.(b)	Details for Berar.(c)	Assam.(d)	Central Provinces.(e)	Burma.(f)	Bombay.(g)	Punjab.(h)	Madras(i).
47	MATCH	8,375	225	...	150	700	1,900	650	1,650
		The considerable import of							
48	AERATED WATERS.	8,350	...	...	50	825	4,525	1,350	325
49	PHOTO-GRAPH.	3,375	25	...	100	300	825	450	725
50	TENT	2,925	...	...	25	275	450	800	75
		The sailmakers of Bombay							
51	ICE	2,700	...	...	50	200	350	725	125
52	PEARL	2,225	...	...	...	400	1,200	...	600

(a) See back of this page.)
(b) In round numbers the population of British India is 232 millions.
(c)) „ „ „ of Berar is 3 millions.
(d) In round numbers the population of Assam is 6 millions.
(e) „ „ of the Central Provinces is 10 millions.
(f) „ „ of Burma is 10 millions.

25 persons in 1901, each ◇ Rs. 10,00,000.

each Province.

North-West Provinces.(*j*)	Bengal.(*k*)	Name of Article.	Imports (00,000 omitted.) Rs.	Exports Rs.	Total of Important Exports and Imports. (Each line of ◇ = £1,000,000 sterling.)
925	2,175	Matches .	44	...	Rs. 44,00,000.
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	⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕

matches should be noted.

475	800				
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475	475				
○○○					
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125	1,175				
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have suffered most.

850	400				
○○					
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...	25	See "7.—Jewellery."			
	○				

(*g*) In round numbers the population of Bombay is 19 millions.
(*h*) „ „ „ of the Punjab is 22 millions.
(*i*) „ „ „ of Madras is 39 millions.

(*j*) In round numbers the population of the N.-W. Provinces is 48 millions.
(*k*) „ „ „ of Bengal is 75 millions.

53.—GAS.

136. Gas works: owners, managers, and superior staff.
137. Gas works: operatives and other subordinates.

54.—BEER.

109. Breweries: owners, managers, and superior staff.
110. Breweries: workmen and other subordinates.

55.—MANURE.

380. Bone mills: owners, managers, and superior staff.
381. Bone mills: operatives and other subordinates.

Each + represents 10 persons in 1891, each ○

Serial Number.	Name of Industry.	Total Persons supported by each Industry in British India.	Details for Berar.	Assam.	Central Provinces.	Burma.	Bombay.	Punjab.	Madras.
53	GAS	1,390	...	...	...	40	260	110	30
54	BEER	730	...	...	...	120	10	230	260
55	MANURE	720	...	...	...	70	10	290	80

TOTAL OF ALL

Each + represents 20,000 persons in

British India.	Berar.	Assam.	Central Provinces.	Burma.	Bombay.

10 persons in 1901, each ◇ Rs. 10,00,000.

each Province.		Name of Article.	Imports (00,000 omitted.)	Exports (00,000 omitted.)	Total of Important Exports and Imports. (Each line of ◇ = £1,000,000 sterling.)
North-West Provinces.	Bengal.		Rs.	Rs.	
10	940	Tar . .	7	...	Rs. 7,00,000
90	20	Hops . .	3	...	Rs. 54,00,000
		Beer . .	51	...	
...	270	Bones . .	...	52	Rs. 53,00,000
		Manure .	1	...	

INDUSTRIES.

1891, each ○ 20,000 persons in 1901.

Punjab.	Madras.	North-West Provinces.	Bengal.

APPENDIX I.

List of Conferences held and Places visited by the Committee.

Place.	Conference.	Technical Colleges and Schools, Factories, etc., visited.
Calcutta . .	Conference, 2 days .	School of Art; Sibpore Engineering College; Oxford Mission Industrial School; Alipore Reformatory.
Jamalpur . .	...	East Indian Railway Workshops.
Allahabad . .	Conference, 1 day . .	East Indian Railway Workshops; Government Press.
Cawnpore . .	,, ,, . .	Government Farm; Woollen Mills; Messrs. Priestly & Co.'s Marble Works; Messrs. Cooper, Allen & Co.'s Tanning and Leather Works.
Lucknow . .	...	Government Industrial School; O. and R. Railway workshops.
Roorkee . .	...	Thomason Engineering College.
Delhi . .	...	Gold-wire work; embroidery; ivory carving; pottery; copper work; foundry and engineering shop.
Lahore . .	Conference, 2 days .	Railway Technical School; D. Jubilee Technical School; St. Francis' Orphanage; Mayo School of Art; the Central Jail; Golab Singh's Press.
Mooltan . .	...	Pottery; enamelling on silver; silk-weaving; carpet-weaving; Messrs. Alibhoy's Tin Box Factory.
Sialkot . .	...	Damascening at Kotli; weaving; Sporting Outfit Factory; Steel Trunk and Cutlery Factory.
Wazirabad . .	...	Cutlery at Nizamabad; weaving.
Amritsar . .	...	Municipal Technical School; Carpet Factories; ivory carving; gold thread and wire making; Repoussé metal works.
Ludhiana . .	...	Municipal Technical School; A. P. Mission Artisan Classes; Mr. Wylie's printing and weaving establishment; shoe-making; weaving.
Hoshangabad .	...	The Friends' Industrial School and workshops.
Burhanpur . .	...	Gold Thread and Wire Factories; silk; and gold and silver tape weaving; Glass Factory.
Nagpur . .	Conference, 1 day . .	Cutlery; weaving; The Empress Mill.
Bombay . .	Conference, 2 days .	Reay Art and Industrial Schools; Victoria Technical Institute; Dock-yard workshops.
Poona . .	...	Yeraoda Reformatory; Yeraoda Jail; Poona College of Science; Municipal Industrial School; Panch Hauds Mission Industrial School.
Ahmednagar .	...	American Mission School; S. P. G. Industrial School; Indian Mission Aid Co.; Carpet Factory.
Madras . .	Conference, 1 day . .	Art School; Anjuman-i-Mujid-i-Islamya Engineering College; Indian Aluminium Factory; Messrs Orr & Sons' Factory; A. E. M. Prabhusing House; Lawrence Asylum Press; S. P. C. K. Press.
Trichinopoly .	...	Cheroot Factories; Silver and Copper Art Works.
Madura . .	...	Technical School; weaving; metal-works; wood-carving.
Karur . .	...	Mission Industrial School.
Kumbakonum .	...	Silk-weaving; bell-metal works; wood-carving.
Rangoon . .	Conference, 1 day .	Silver art works; wood-carving; silk-printing.
Mandalay . .	...	Silk weavers; embroidered cloth workers; wood-carvers.

APPENDIX II.

Summary of Opinions expressed at Conferences.

A.—IMPROVEMENT OF LOCAL INDUSTRIES.

(*a*) What has been done so far.

1.—Description of Schools, Government and Private, with methods of instruction.

(1) Please give a complete list of Industrial Schools, Government and Private, in the Province, with date of foundation, industries taught, average attendance and output of artisans annually.

The Committee find that the information given them is not sufficient to enable them to make a complete list of Industrial Schools, but the available information has been tabulated in a form which will be found in Appendix III.

(2) Was there any special reason for the selection of the present location?

The reasons leading to the foundation of schools have been various, but in the majority of instances they have not been either the support of local indigenous industries, or the desire to meet the demand for a special class of skilled labour.

(3) How is each school or group of schools governed?

Industrial Schools may be divided into three classes:—

(*a*) Government, Board, and Municipal Schools, with few exceptions, under the control of a local committee.

(*b*) Aided schools under private management.

(*c*) Unaided schools under private management.

(*a*) and (*b*) are subject to inspection by the officers of the Educational Department, who have seldom any special technical qualifications.

(4) Are the schools self-supporting; if not, what is the average annual net cost?

In no case are schools self-supporting: particulars of the net annual cost of the different schools, in so far as they are available, are given in Appendix III.

(5) Why were the particular trades selected which are taught in the schools?

From Appendix IX it will be seen that a general preference has been given to carpentry and blacksmith's work. The facility of finding subsequent employment for the pupils was the reason usually assigned for the selection of these and the other industries taught.

(6) How are Superintendents selected; and what are their qualifications, duties, and pay?

In Municipal and Board Schools, the Superintendents are usually supplied by the Art Schools or Technical Colleges. The Superintendent of Mission Schools is as a rule the Missionary himself or an European craftsman. The qualifications, duties, and pay vary greatly.

(7) How are Superintendents and Instructors trained? Is there any regular training school or other source of supply?

Normal training for Superintendents and Instructors is not supplied in any Province.

(8) How are students selected, from what classes of the population? Are there any tests applied? Have you attracted the classes aimed at?

There is no general rule of selection, though preference is usually given to the sons of artisans. Educational tests are rarely required. The classes aimed at have not, generally speaking, been attracted.

(9) What are the rules regarding age, fees, scholarships, period of training, test of final qualifications, character, and discipline?

The available information is given in Appendix III.

(10) What proportion of students afterwards follow the trades they are taught in the school?

Registers have not been systematically kept up, but excepting in Mission Schools the proportion appears to be small.

(11) How are materials and tools provided? What is done with the work turned out?

Materials and tools are provided from the school funds. With the exception of those schools, in which a course of manual training is given, the output is sold if purchasers are forthcoming.

(12) Are there any special methods of instruction employed; if so, have any of these showed marked promising results?

The methods of instruction employed, may be classified as—

(i) Manual training;

(ii) The Factory system;

(iii) A combination of (i) and (ii).

The most practical training appears to have been obtained by the Factory system.

(13) Is the instruction specialized for particular students, or are the students run through all the classes of trades taught in the school? Are English or Native methods of instruction used?

Where trades are taught it is stated that the instruction is specialized.

(14) What general education is given in addition to regular industrial training? (*N.B.*—Drawing is industrial.) What is the test of the quality of the work turned out?

General instruction is almost universally given; sale and examination tests either separately or conjointly.

(15) Has any attempt been made to improve the quality of work in particular industries or the tools or machines? If so, please specify industries and the improvements made?

Improvements are claimed to have been made as shewn below:—

In Bengal in sericulture, hand-weaving.

„ Punjab in wood-carving, joinery, hammered metal-work, and glazed tiles.

„ Central Provinces in hand-weaving.

„ Bombay in carpet-weaving and carpentry.

„ Madras in metal-work, pottery, hand-weaving.

And generally in the introduction of European tools in wood and iron-work.

(16) Do you consider the present system the best, or can you suggest improvements?

Except where schools were organized on the Factory system, there was a general feeling that they were unsatisfactory.

Suggestions were made in favour of—

The reduction of general education;

The standardization of courses, where this had not been already done;

The substitution of the manufacture of articles of saleable value for manual training.

2.—Native System of Apprenticeship.

(1) What is the Native system of keeping up a supply of artisans for the ordinary Native arts and trades?

When a child is ready to receive instruction, generally at the age of six or seven, he is taken by his parents or guardian on some auspicious day to a master artisan, usually a relative or friend. The parents make a small present to the artisan, the child then becomes an apprentice and is bound to perform any work that the artisan may require of him, serving his master faithfully till he arrives at the age when he can commence work for himself. His duties include, among other things, such menial service as opening and cleaning the shop, and keeping his master's tools in proper order. Occasionally food is supplied in return for this service. After some months when he becomes more useful a small allowance is made to him which is gradually increased as his work becomes more valuable, till the apprenticeship is completed.

In Burma, where there is no caste system, the age of commencing apprenticeship is 13 and upwards, and enquiries are made as to the applicant's character.

(2) Is one system or method common to all trades, or are there several different systems or methods?

The system as above described seems practically universal.

(3) Are there any special objections to or advantages in the Native systems? Please specify.

The following objections and advantages were adduced:—

Objections—

(i) The absence of indentures;

(ii) The apprentice cannot become a better workman than his master;

(iii) The absence of theoretical instruction;

(iv) Instruction is confined to members of the caste;

(v) The absence of systematic instruction in drawing (Burma excepted);

(vi) The limitation of design;

(vii) Inferior tools are used;

(viii) The expansion of the trade is limited.

Advantages—

(i) Thoroughness of the training;
(ii) Limitation in the number of apprentices to each craftsman
(iii) Specialization;
(iv) Hereditary aptitude;
(v) Instruction in the business of the trade as well as the technique;
(vi) Inexpensive and practical training;
(vii) Early familiarity with the tools of the trade;
(viii) Preservation of old designs and ideals;
(ix) Training obtainable by the poorest.

(4) How can the best craftsman in any particular trade be most easily identified?

By local reputation, and the quality of his productions.

(5) Do you think that the Native system of apprenticeship is superior or inferior to the average Industrial School in method? Can it be extended in practice? Can it be influenced by outside expert suggestion, advice, or interference, and how best?

The weight of evidence was in favour of the method of instruction adopted in the apprenticeship system in preference to regular instruction as given in the average Industrial School. This opinion was, however, by no means universal. As regards the extension of the Native system and its improvement by expert advice, opinions differed greatly.

(6) Are any fees paid by Native apprentices? Do they receive any remuneration for work? Can you give any information regarding ages and preliminary education?

No fees are paid, but presents are usually given to the master artisan. Remuneration for work is given as soon as the apprentice's work becomes valuable. In some cases food is given from the commencement in return for menial services rendered. There is no fixed age for commencement, but it is usually in early childhood, and no preliminary education is given.

(7) Will the craftsmen take in apprentices of all classes or only of their own class?

Where the caste system is strong the apprentices are usually only taken from within the caste.

(8) Have famine sufferers been taught trades by Native agency which they would not ordinarily follow? Was such Native agency readily procurable, and on what terms?

There was no useful information available on this point.

(9) What particular inducements would you offer craftsmen to induce them to improve and extend their system of training?

The following inducements were suggested:—

(i) Exhibitions;
(ii) Rewards for good work;
(iii) Subsidies to the craftsmen;
(iv) Expert advice;
(v) Supply of patterns and designs;
(vi) Supply of orders;
(vii) Payment by result of apprentices' work;
(viii) Supply of improved tools;
(ix) Improved markets;
(x) Stipends to apprentices;
(xi) Institution or recognition of Sir Panchs, and local Panchhayats;
(xii) Improving the premises of temples to be used as workshops;
(xiii) Taccavi advances.

(10) Are there trade guilds in the Province, and if so, in what trades, and where?

There are indications of the existence of trade guilds in various places, but they do not appear to exercise any marked influence on the apprenticeship system. All the information obtained on the subject will be found in Appendix VI.

(11) Where they exist, can they be utilized for the improvement and expansion of industries?

The opinion was generally in favour of an attempt to utilize them.

3.—Principal Industries of the Province.

(1) Please state the principal industries of the Province.

See Part III of the Report.

(2) Which of the above would you recommend being specially supported or encouraged?

The following industries :—

Bengal.	North-Western Provinces.	Punjab.	Central Provinces.	Bombay.	Madras.	Burma.
Weaving . .	Weaving .	Weaving .	Weaving .	Weaving .	Weaving .	Silk-weaving.
Metal-work .	Metal-work .	Metal-work .	Metal-work .	Metal-work .	Metal-work (Locks, hinges, etc.)	Metal-work (iron)
Glass . .	Glass . .	...	...	Glass . .	Glass . .	Glass. .
Pottery and Terra Cotta.	...	Glazed Pottery	...	Pottery and Bricks.	...	Pottery.
Tanning . .	...	Leather work .	Tanning .	Tanning and Leather work.	...	...
Basket-work .	...	...	...	Cane-work .	...	Basket-making.
...	Cotton-printing	Cotton-printing	...	Cotton-printing	...	Silk-printing.
...	...	Lacquer-work .	...	...	...	Lacquer-work.
...	...	Wood-work .	Wood-work .	Wood-work .	...	Wood-carving.
...	...	...	Sericulture .	...	...	Sericulture.
...	...	Cutlery . .	Cutlery . .	...	Cutlery . .	...
...	...	Jewelry . .	Gold-wire drawing.	Gold and Silver jewelry.	...	Gold and silver jewelry.
Iron and steel .	...	Enamelling .	...	Rope-making .	Buttons, lamps, etc.	Artificial flowers.
Saltpetre .	Ghee . .	...	...	Oil-pressing .	...	Cheroots.
Acetylene .	Paper . .	...	...	Dyeing . .	...	Ivory-carving.
Matches . .	Matches . .	...	...	...	...	...

(3) Can you give any reasons why support or encouragement is specially required, and what direction should the support or encouragement take?

The reasons given for affording support to the industries were—

(i) Prospect of development if research were undertaken;
(ii) Importance of the industry;
(iii) Inadequate supply of good work;
(iv) Danger of extinction of indigenous industries;
(v) Scarcity of labour;
(vi) Need of assistance in competition with foreign markets;
(vii) Need of extended markets;
(viii) Poverty of artisans;
(ix) Lack of system, method, and adequate machinery;
(x) Prospect of being able to manufacture in India raw material at present exported;
(xi) Prospect of being able to replace imported goods by articles made locally;
(xii) Need of replacing imported labourers;
(xiii) Helplessness and ignorance of the workmen.

The methods of affording help suggested were :—

(i) Placing of Government orders;
(ii) Training Schools and expert advice;
(iii) Regulation of freight charges;
(iv) Exhibitions and prizes;
(v) Efficient registration of designs and trade marks;
(vi) Help in buying improved tools;
(vii) Protection of industries;
(viii) Financing the workers and relieving them of the middlemen;
(ix) Supply of larger markets;
(x) Facilitating sale;
(xi) Organization of world-wide advertising.

(4) What are the reasons for other industries not requiring support?

The general opinion was that most of the hand industries required support, but those mentioned were most urgently in need of it.

(*b*) WHAT IS PROPOSED TO BE DONE TO CARRY OUT THE EDUCATIONAL CONFERENCE RESOLUTIONS.

1.—Proposed alterations and additions in system and method.

(1) Do you approve of the existing methods of schools, or would you propose any other methods of training in the existing schools?

The existing methods of schools were not approved of. Generally speaking the changes proposed are —

the reduction of general education in the school;

the specialized training of a pupil throughout his course;

the introduction of expert instruction.

Many authorities were in favour of trying the Casanova system.

(2) If you do not approve the school system, how do you propose to provide a training for artisans in the future?

The Casanova system or an apprenticeship system was approved where found practicable. It was, however, generally recognised that a normal school for teachers was required where experts might train teachers as instructors for craft schools.

(3) Do you consider any provision should be made for advancing specially promising students from an industrial institution to a higher class?

The general opinion is in favour of such provision by the granting of scholarships tenable at higher Technical Colleges.

(4) Which do you consider the best method of training Foremen or Assistant Managers of works?

The following methods of training foremen were advocated :—

Natural selection.—Practical training for the whole day in the workshop, supplemented by theoretical training in a night school. This is regarded as producing the most practically useful chargemen.

Specialized Training.—For those who start with a fair general education, two systems were advocated—

(i) Half the day theoretical training in a college, along with half the day practical training in a workshop, over a period of two or three years, followed by a period of whole time workshop training.

(ii) Workshop training for three or four years, followed by theoretical training in a college.

The latter system was regarded as the more satisfactory, as the apprentice is better able to appreciate the theoretical instruction given.

(5) Do you think their training can be completed in a college or a school?

The general opinion was that it could not be.

(6) Do you think a method of final training in large workshops advantageous and practicable? In this case should a fee be paid to the shop or a scholarship given to the student?

The final training in workshops was approved, and it was generally felt that no fees should be paid to the shops, but there was a diversity of opinion as to the giving of stipends to the apprentices, some holding that the apprentice's services should be of sufficient value to justify his being paid a subsistence allowance.

(7) As regards the methods employed in private schools, what measures are you prepared to take for ensuring that they are conducted in conformity with Government Industrial Institutions? Would you give—

(i) an annual grant,

(ii) a grant to cover initial expenses,

(iii) free expert advice,

accompanied with conditions?

The general opinion seemed to be in favour of all three proposals, rather than of any special one.

2.—Proposed alterations and additions in schools and of the want of new schools.

(1) Can you suggest any improvements to existing schools apart from changes in the methods of teaching or training?

The proposals included, besides minor alterations,—

(i) The diminution of general education;

(ii) Increased inspection;

(iii) The introduction of improved machinery.

(2) Would you approve of the institution of new schools or a new school in the Province now or in the near feature, and if so—

(i) In what locality, and are premises available?

(ii) For what trades?

(iii) Under what system and method?

(iv) How would you finance it? Are there any special funds available?

The following schools were proposed :—

Bengal—

A peripatetic weaving school, no premises available; men to be trained at Serampore to become instructors of their fellow weavers.

Dr. Watt advocated the following schools :—

Calcutta	for	metal-work, basket-work, and weaving.
Dacca	„	textiles, ivory, and silver-work.
Patna	„	glass, weaving, and pottery.
Cuttack	„	mat and cane-work, silver-work, and weaving.

Mr. Pedler has proposed to take steps in three directions —

(*a*) Industrial research;

(*b*) Instruction in the results of such research;

(*c*) Instruction in processes at present followed by the best Native craftsmen.

Definite proposals have been prepared only in reference to (*c*). Briefly, the instruction is to be imparted by the craftsman in his shop to 20 pupils receiving monthly stipends at Rs. 2 per mensem, the craftsmen to be rewarded by the use of the pupils' services. Drawing is to be taught by a Government Instructor on Rs. 20 to Rs. 30 per mensem. When required an Instructor is to be provided to teach the theory of the craft on the same pay. Control is to be exercised by the local executive and educational officers.

North-West Provinces—

Cawnpore—A boarding and day school for European and Eurasian boys. No premises are available; the Government would probably give a grant.

His Honor did not wish any more industrial schools to be started till the experiment at Lucknow had been fully worked out.

Punjab—

Schools at—

Lahore	for	pottery and glazing, glass and silk-weaving.
Hoshiarpur	„	ivory inlay and wood-work.
Multan	„	pottery.
Bhera	„	cutlery and jade-stonework.
Sialkote	„	damascening.
Wazirabad	„	cutlery.
Patankote	„	bamboo furniture.
Jullandhar	„	wood-carving and turning.
Chiniot	„	wood and brass-work.
Peshawar	„	pottery and wax embroidery on cloth.
Delhi	„	ivory carving and jewelry.
Ludhiana	„	cotton-weaving.
Kangra	„	silver-work.

Of these it was proposed to take up at once Multan, Sialkote, Wazirabad, and Ludhiana.

Central Provinces—

Research should first be made into possible improvements in weaving and sericulture, subsequently the results might be taught in schools to be started —

(*i*) for weaving at Amrer and Nagpur;

(*ii*) for sericulture at Chanda and Sambalpur.

Schools for Carpentry and Blacksmith's work at Jubbulpur and Nagpur. The schools to be on the Casanova system and financed from Provincial Funds.

Bombay—

Normal Classes at Bombay and Poona to be followed by an Industrial School in each revenue division.

Madras—

No schools are to be started until final orders have been passed on the methods at present adopted in the Aluminium Department of the Arts School.

Burma—

No proposals except for apprenticeships.

In general a disinclination was evinced to making definite proposals regarding the establishment of schools till the best methods of imparting instruction had been worked out.

(3) Do you approve of night schools for the voluntary improvement in theory of artisan and industrial students who are willing to attend and pay a small fee? Are the local conditions likely to lead to success?

Opinion was practically unanimous in favour of the maintenance of night schools, at which attendance should be voluntary, though it was recognized that only a small percentage of workers would probably attend.

(4) Should such night schools be under the General Education Department or the Industrial School Management?

Opinions were divided as to whether the night schools should be under the Educational Department or the special Technical Department.

(5) Are you in favour of the establishment of Training Schools for Superintendents and Instructors, and do you propose to take steps in this direction at once?

All felt the need of Training Colleges for Instructors, but it was generally agreed that such Colleges would have to supply teachers for more than one Province.

(6) Can the necessary instructors be provided in existing institutions?

It was generally stated that at present thoroughly qualified instructors could not be provided by existing institutions.

3.—How the Neapolitan Scheme would apply.

(1) Do you approve of the method of the Naples scheme generally?

The method of the Casanova system met with general approval, but doubts were expressed as to the possibility of its adaptation to the conditions of India.

(2) Do you think craftsmen working at their trades and financing them will consent to work in an industrial school under the control of a Superintendent?

Grave doubts were expressed as to whether craftsmen could be induced to work under these conditions.

(3) Should such schools be in an enclosed private area or open freely to the public?

The great majority of opinion was in favour of the school being open to the public.

(4) What special inducements should be offered to craftsmen to co-operate?

The following inducements were suggested:—

(i) Free quarters;
(ii) Use of the boys' labour without payment at the commencement;
(iii) The privilege of selling their goods either at the school or at their own houses;
(iv) Permission to exhibit their goods for sale in museums;
(v) A salary or subsidy;
(vi) Payment by piece for work done;
(vii) Bonus for each apprentice who reaches a certain standard;
(viii) Free supply of improved tools and machinery;
(x) Small allowances to apprentices;
(x) Supply of orders for work;
(xi) Supply of capital;
(xii) The official recognition of the artisan as the Sir Panch or head of the trade in the town or district.

(5) How would you suggest dealing with the following points:—

(i) Supply of materials;
(ii) Waste of materials;
(iii) Sale of work made;
(iv) Exhibitions of work made;
(v) Support of impecunious apprentices while unable to do remunerative work;

(vi) Divisions of profits (when the apprentice becomes more or less expert) between the school, the craftsman, and the apprentice;

(vii) Holidays including Sundays;

(viii) Discipline of apprentices;

(ix) Fees.

The only opinions founded on experience were the following:—

(i) Certain important materials which can be purchased on advantageous terms should be supplied at cost price to the artisan, while he should himself purchase petty materials.

(ii) Waste may generally be neglected.

(iii) The work would belong to and be sold by the master artisan.

(iv) A show room should be maintained for the exhibition and sale of specially good work;

(v) Support should be given, but with discrimination;

(vi) The profit should remain with the craftsman;

(vii) This may be left to the craftsman;

(viii) This may be left to the craftsman;

(ix) Fees should be levied when such a course is possible.

(6) Would you attempt to improve the craftsman's practice of work, and how?

The following suggestions have been made:—

(i) Improved tools;

(ii) Expert advice.

4.—Would you accept experts from abroad in each industry?

(1) Generally speaking, would it be best to have a working expert, *i. e.*, a general hand for each school, or a specialized working expert for several schools? Is it possible to obtain a sound general expert, and, if so, in what trades?

The weight of opinion was that a general expert does not exist, and that specialized experts are required for the different trades.

(2) If you approve of specialized working experts, should they be Provincial or Imperial?

Opinions were divided as to whether the experts should be Provincial or Imperial, but it was generally felt that no Province could maintain a full staff of experts for itself alone.

Bombay submitted a special scheme for the utilization of experts.

(3) What would be the annual average cost of such an expert?

The rates quoted varied from Rs. 250 to Rs. 800 per mensem.

(4) For what trades at present do you consider specialized working experts are required in this Province?

Trades were suggested as under:—

Bengal.—Weaving.

North-Western Provinces.—Weaving, ghee, sugar, glass, cabinet-making.

Punjab.—Weaving, pottery and glazing, metal-work, glass.

Central Provinces.—Weaving, sericulture, carpentry, blacksmith's work.

Bombay.—Weaving, pottery and tiles, glass, dyeing.

Madras.—Manufacture of drugs.

Burma.—Weaving, silver-work.

(5) Can you define the status and qualifications required in these experts?

The expert should be one with a thorough practical knowledge of his trade, well versed in its theory, willing to impart his knowledge, and, if possible, possessing the diploma of some recognised technical college.

(6) How should the expert proceed to improve manipulation and practice?

The expert would first carefully study the industry locally, and then proceed to the erection of a laboratory or workshop, and only introduce improvements by suggestions after careful experiment.

5.—Proposed Department of Control, Central and Local, for Urban and Rural Schools.

(1) Apart from the Superintendent in direct charge of the school, what system of local control do you think the best—

(i) For Rural schools?

(ii) For Urban schools?

Opinion was partly in favour of control by Local Boards and Municipal Committees, but mainly in favour of the appointment of special Local Committees of persons interested in the trade, for both Urban and Rural schools.

(2) What should be the functions of the Local control in each case?

It was held that the functions of these committees should be confined to inspection and to making recommendations for improvements in the schools.

(3) The Local systems of control must, it is presumed, be focussed for the Province by some technical officer who will be generally responsible for executive administration and management. Who should this be?

Opinions were expressed as follows:—

Bengal.—The Principal of Seebpur College.

North-Western Provinces.—The Principal of Rurki College.

Punjab.—The Principal of the Mayo Art School.

Central Provinces.—The governing body of the proposed Technical Institute, Nagpur, (comprising the Chief Commissioner, Commissioner of Agriculture and Settlements, the Director of Public Instruction, and other Trustees).

Bombay.—A special officer from England to be appointed.

Madras.—A special officer.

Burma.—Mr. Tilly (the Collector of Customs).

(4) Would it not be best to relieve the Educational Department of the extra burden that Industrial schools must constitute owing to this department not having, as a general rule, any special technical qualifications?

Opinions were expressed as follows:—

Bengal.—Special technical Inspector under the Director of Public Instruction.

North-Western Provinces.—Yes.

Punjab.—No objection to a separate department.

Central Provinces.—Yes.

Bombay.—A special officer in the special Imperial Department, if created, otherwise under the Director of Public Instruction.

Burma.—Yes.

(5) Is direct and special Imperial control of Industrial Education necessary for its efficient development?

The opinions of the various Provinces were as follows:—

Bengal.—The Honorable Mr. Slacke was of the opinion that Imperial control must come. Mr. Pedler concurred, but limited its functions to those of an advisory nature.

North-Western Provinces.—His Honor was in favour of Imperial control.

Punjab.—Mr. Bell and the Conference generally were in favour of Imperial control, preferably limited to advisory functions.

Central Provinces.—Mr. Monro was in favour of Imperial control, which, Mr. Sly added, should be limited to inspection and advice on the lines of the Inspector of Agriculture.

Bombay.—Mr. Giles: "It is obvious that the central institution should exercise advisory control, but I do not think that any really effective control can be exercised, unless (*a*) either a special department is formed for all India, or (*b*) a special full-time officer is appointed for the Presidency."

Madras.—The Honorable Mr. Stuart does not think that Imperial control is at present necessary.

Burma.—His Honor thought that Imperial control was necessary.

6.—*Exhibitions and sales, whether required.*

(1) Are exhibitions of any real value—

(i) Local;

(ii) Provincial;

(iii) Imperial?

There was a general consensus of opinion in favour of exhibitions being held, though diverse views were entertained of the exact form which they should take. Local exhibitions were generally considered to be the most useful form.

(2) Can you suggest any conditions which would make exhibitions of value to the industrial progress of India?

The following suggestions were made:—

Money rewards and certificates.

Purchase of best exhibits.

Restriction of side-shows.

Free admission to artisans.

Free conveyance of exhibits and artisan visitors.

Exhibition of improved tools and machines.

The easy protection of inventions and designs.

Establishment of permanent exhibitions in each Presidency.

Distribution of photographs of the best work exhibited.

(3) Do you approve of sale-rooms for schools, or, if not, what method would you employ for the disposal of the work output? Thus it may be—

(i) scrapped;

(ii) made to order only, private or by regular agent;

(iii) sold through agents as produced;

(iv) sold directly by the producer as in the case of schools on the Casanova system;

(v) sold in a regular school sale-room.

Should prices be marked or fixed at all?

Opinions were mainly divided, between sale-rooms, commission agents, and orders, whilst fixed prices to be revised from time to time were mostly approved of, except in the case of transactions with wholesale dealers, which must be conducted on business principles.

(4) Regarding industries generally in India, are you aware of any financial conditions which affect—

(i) production;

(ii) price;

(iii) returns to workmen;

which could be removed by the reasonable action of Government?

It was stated that the following financial conditions injuriously affected the state of industries in India:—

Unequal incidence of railway freights;
The high rates of interest;
Indebtedness of workmen.

The following remedies were suggested:—

Industrial Banks;
Supply of raw material on credit.

(5) Can you say whether, generally speaking, the workman gets the best wage or profit return from—

(i) expensive fine work?

(ii) cheap common work?

Opinions varied, but there was a general feeling that expensive work involved the use of capital which had to be obtained from the middleman, who thus reduced the workman's profits to a minimum, and that purchasers were also unwilling to pay the extra cost of good work.

A high class workman naturally received better pay than an inferior workman of the same class.

(*c*) How funds are to be provided.

(1) Could the Provincial Funds provide the cost of starting the necessary schools? If not, how should the cost be divided between the Local Government and the Government of India?

The provision of funds depends upon the conditions of the Provincial contracts.

(2) Do you propose to find funds for the schools until they are self-supporting and, in addition, for the setting up in trade of pupils taught at the schools? How would you recover such advances if made, and in what period?

There was a general opinion that it would be extremely difficult to make industrial schools self-supporting.

While it was advantageous to start past pupils in business, there were many objections against a system of advances by Government.

A scheme of factories under commercial management, as adjuncts to schools, was suggested as one solution of the difficulty.

(3) Would you support the present position of workers in hand industries by a system of advances on the method of State loans to agriculturists, either—

(i) for the purchase of improved implements?

(ii) to free them from the exactions of the middlemen?

The advantages of loans to workmen, especially when for the purpose of purchasing improved implements, were fully recognised, but great doubts were entertained as to the prospect of recovering such loans. It was suggested that the group system of advances might be tried.

(4) Are you in favour of any scheme of Industrial Banks?

The most authoritative opinion was in favour of Industrial Banks generally, but it was suggested that it would be best to wait and see the result of the Agricultural Banks before starting them.

B.—INTRODUCTION OF NEW INDUSTRIES.

(*a*) What Artisans to be introduced.

(1) Name the industries to be introduced?

In replying to this question it may be assumed that no industry can be at once introduced—

(i) which requires preliminary research as to methods and practice;

(ii) which does not necessitate the remunerative employment of a large number of workers;

(iii) which can be better exploited in a mill or by private agency;

(iv) which does not supply some requirement of India;

(v) which cannot in the future be transferred for commercial working to private agency.

Bengal.—Railway carriage and waggon building.

Punjab.—Photomechanical process, lens grinding, button-making, candle, nib, pencil, and slate manufacture.

Central Provinces.—Iron smelting.

Bombay.—Nail-making from scrap.

Madras.—Paper-making and matches.

Burma.—Enamel ware.

(2) Has your experience with jail industries suggested any such?

No.

(3) What goods are made in jails not made elsewhere in the Province? Do they find a ready sale at prices which would pay a free man?

Carpet-making in Burma.

(4) Have you any scheme for starting these new industries by securing that discharged prisoners should work on at their trade after they leave the jail?

Local Government have no scheme, but Mr. Fry at Ahmednagar expressed his willingness to take on such workmen.

(*b*) What Artisans are required.

(1) Are there any lines of work requiring trained artisans of which the supply is now limited or badly trained?

Bengal.—Rivetters, fitters, blacksmiths, carpenters.

Punjab.—Joiners.

Central Provinces.—Carpenters, blacksmiths, tinsmiths, masons, plumbers.

Bombay.—Trained compositors, plumbers, stone carvers, and in every trade more highly skilled workmen are required.

Madras.—

Burma.—Plumbers, Burmese carpenters, blacksmiths, tinsmiths, mechanical engineers.

APPENDIX III.

List of Existing Industrial Schools.

Serial number.	Province.	Place.	Status of School.	Date of formation.	Trades.	Superintendent.
1	Bengal	Giridih	Aided, Industrial School.	1891	...	...
2	„	Ranchi	Government Industrial School.	1880	...	...
3	„	Calcutta	Aided, Oxford Mission Industrial School.	...	Carpentry	...
4	„	Koarapukur	Diamond Jubilee School.	1897	...	...
5	„	Murshidabad	Technical School	1885	Carpentry, embroidery, and bidri work.	...
6	„	Kankinara	Diamond Jubilee School.	1897	Gardening, manipulation of mechanical instruments.	...
7	„	Teghari	Private, Sramajibhi U. P. School.	...	Gardening, carpentry, lock-making.	...
8	„	Katikund	Aided, Industrial School.	...	Carpentry, gardening	...
9	„	Pakaur	Aided, Mission Industrial School.	...	Carpentry	...
10	„	Bhanpur	Private, Industrial School.	...	Carpentry	...
11	„	Alalpur	Aided, Industrial School.	1888	Carpentry, needle-work	...
12	„	Hurlong	Private, Industrial School.	...	Blacksmith's work	...
13	„	Bagda	Do.	...	Do.	...
14	„	Chitrapur	Do.	...	Do.	...
15	„	Silli	Do.	...	Do.	...
16	„	Baranda	Do.	...	Do.	...
17	„	Bunda	Private, Industrial School.	...	Carpenters and blacksmiths.	...
18	„	Malda	Aided, Industrial School.	...	Blacksmiths.	...
19	„	Ghatsila	Aided, Industrial School.	...	Carpenters.	...
20	„	Boalia	Aided, Diamond Jubilee School.	1897	Sericulture.	...
21	„	„	Private, Indian Art School.	...	...	...
22	„	„	Private, Jubilee Art Academy.	1887	...	...
23	„	*Midnapur	District Board, Technical School.	1885	...	...
24	„	*Rungpur	Ditto ditto	1888	...	...
25	„	*Barisal	Ditto ditto	1890	...	...
26	„	*Pabna	Ditto ditto	1892	...	...
27	„	*Comilla	Ditto ditto	1892	...	...
28	„	*Burdwan	Ditto ditto	1893	...	...

* These schools also train boys for the Sub-Overseer and Amin classes of the Sibpur College. Selected artizans also go to the college for further training.

Superintendent's qualifications.	Teacher's qualifications.	Average attendance.	Number of boys passed out annually.	Net cost per annum.	Gross cost per annum.	Government grant per annum.	Municipal or Board grant.
				£	£	£	£
...	...	25	...	...	...	120	...
...	...	45	...	2,721	...	1,599	...
...	...	104	...	12,765	...	300	...
...	...	12	...	...	...	...	...
...	...	19	...	144	...	...	144
...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...
...	...	12	...	384	...	...	...
...	...	12	...	1,260	...	360	...
...	...	11	...	300	...	...	...
...	...	21	...	720	...	...	...
...	...	12	...	228	...	48	...
...	...	15	...	228	...	...	48
...	...	22	...	242	...	...	62
...	...	21	...	72	...	72	...
...	...	25	...	72	...	...	72
...	...	26	...	192	...	...	192
...	...	7	...	60	...	...	60
...	...	10	...	152	...	32	...
Taught by an Indian expert who has studied in Europe.	...	11	...	1,807	...	180	1,049
...	...	30	...	900	...	...	...
...	...	59	...	4,120	...	...	...
...	...	5	...	2,474	...	400	1,281
...	...	26	...	5,817	...	640	3,362
...	...	16	...	5,091	...	...	3,580
...	...	2	...	4,796	...	600	1,472
...	...	18	...	7,314	...	...	5,723
...	...	...	...	2,400	...	...	1,507

Serial number.	Province.	Place.	Status of School.	Date of formation.	Trades.	Superintendent.
29	North-Western Provinces.	Lucknow	Government Industrial School.	1892	Carpentry, iron-working, glass-blowing, clay-modelling, dyeing.	Mr. Swintchatt
30	„	Cawnpore	A. E. M., Mission Industrial School.	1899	Carpentry, iron-working, painting.	Missionary
31	„	Mirzapur	.....	1900	Carpentry	Drawing Master of High School.
32	„	Bareilly	Government Reformatory.	1889	Carpentry, blacksmith's work, cane-work, tailoring, shoe-making, agriculture, cotton-weaving, pottery.	Englishman
33	„	Shahjehanpur	A. E. M. Mission	1865	Carpentry, blacksmith's work, weaving and rope-making, shoe-making, agriculture, dairy-work.	Missionary
34	„	Sardhana	R. C. Mission	...	Tailoring, shoe-making, carpentry, blacksmith's work, tin-work, masonry, agriculture, domestic service.	Ditto
35	„	Saharanpur	Mission Industrial School.	1848	Carpentry, blacksmith's work, gardening, shoe-making.	Europeans
36	„	Meerut	Private, Vaish Orphanage.	1900	Carpentry, tailoring	...
37	„	Roorkee	Government Industrial School at Engineering College.	...	Mechanical apprentices, press-work and book-binding, photography and photo-mechanic process work; art brass and wood-work, stone-carving and painters' work.	
38	„	Cawnpur	Private, S. P. G. Industrial School.	1891	Printing in all its branches, book-binding, carpentry, cabinet-making.	
39	„	Gorakhpur	Private, C. M. S. Orphanage.	...	...	
40	„	Secundra	Ditto.	...	...	
41	„	Aligarh	Private, A. E. M. Industrial School.	...	...	
42	Punjab	Lahore	Government School of Art.	1875	Pottery, carpentry, metal-work.	Mr. P. Brown
43	„	Gurgaon	Aided, Cambridge Mission.	1888	Shoe-making, tailoring, carpentry.	Missionary
44	„	Lahore	Aided, Government, Railway Technical School.	1889	Carpentry, metal-work	Mr. Chiranji Lall, B. A.
45	„	„	Frontier Faith Mission.	1897	Shoe-making	...
46	„	„	St. Francis Orphanage	...	Carpet-making, shoe-making, tailoring.	...
47	„	Amritsar	Municipal Board, Industrial School.	1886	Carpentry, metal-work	...

Superintendent's qualifications.	Teacher's qualifications.	Average attendance.	Number of boys passed out annually.	Net cost per annum.	Gross cost per annum.	Government grant per annum.	Municipal or Board grant.
				R	R	R	R
...	...	100	4	...	11,000	...	...
Experience of such work in America.	Bazar Mistris	35	...	2,400	...	...	...
School of Art, Lahore, certificate.	Ditto	...	...	...	...	...	...
Late Professor of Latin, Rangoon College.	...	255	20(P)	9,115	...	...	...
...	...	30	...	400	...	...	...
...	Bazar Mistris	131	...	10,000	...	...	...
Technically trained	Generally Europeans on Rs. 50—100.	53	...	13,200	...	...	...
...	Bazar Mistris	22	...	350	...	...	...
...	...	54	...	...	...	...	...
South Kensington certificate, English teaching experience.	School of Art certificates.	288	31	21,286	...	...	...
...	Drawing Master, School of Art certificates, Bazar Mistris.	44	...	...	...	...	...
B. A. and School of Art certificate.	School of Art certificates.	313	25	8,000	...	...	...
...	...	185	...	...	...	...	
...	...	...	...	2,469	...	...	...
School of Art certificate.	...	117	13	3,245	...	...	...

Serial number.	Province.	Place.	Status of School.	Date of formation.	Trades.	Superintendent.
48	Punjab .	Clarkabad .	Church Missionary Society's Industrial School.	1897	Carpentry, tailoring, gardening.	...
49	„	Ludhiana .	District Board, Industrial School.	1896	Carpentry, metal-work .	...
50	„	„ .	American Mission High School, Industrial classes.	1892	Carpentry, tailoring, shoemaking, carpet-weaving.	Missionary .
51	„	Delhi . .	District Board, Industrial School.	1890	Carpentry . . .	...
52	„	Ferozepore .	Private, Orphanage .	1897	Carpet and durrie-weaving, hosiery and lace-making.	...
53	„	Bhiwani .	Ditto .	...	...	...
54	„	Lahore . .	Private, Victoria Jubilee Hindu Technical Institute.	...	...	...
55	„	„ . .	Private, D. A. V. College, Tailoring Class.	...	...	...
56	„	Rawal Pindi .	Private, Sri Bala Kem Singh's Industrial School.	...	Watch-making, carpentry, tailoring.	The Founder's General Agent.
57	Central Provinces.	Parsabhadr, Raipur.	Private, Mission Orphanage.	...	Agriculture . . .	...
58	„	Bisrampur, Raipur.	Ditto.	...	Carpentry, blacksmith's work, agriculture, printing.	...
59	„	Chandkhuri, Raipur.	Ditto.	...	Carpentry, Weaving, Gardening.	...
60	„	Dhamtari, Raipur.	Private, American Mormonite Mission Orphanage.	1899	Carpentry, blacksmith's work, gardening, domestic service.	...
61	„	Mungeli, Bilaspur.	Private, Christian Mission Orphanage.	...	Agriculture . . .	...
62	„	Nagpur . .	Private, The Thana Orphanage.	1897	Carpentry, Agriculture.	...
63	„	Bhandara .	Private, F. C. Mission Orphanage.	1897	Rope, basket-making, tailoring, tatpath-making.	...
64	„	Chindwara .	Private, Swedish Mission Orphanage.	...	Agriculture, carpentry, blacksmith's work, sewing, and Mason's work.	...
65	„	Chanda . .	Private, Mission Orphanage.	...	Carpentry and agriculture.	...
66	„	Nimar . .	Private, A. E. M. Orphanage.	1895	Carpentry, gardening, tailoring.	...
67	„	Narsingpur .	Private, Hardwicke Christian E. M. Orphanage.	1895	Carpentry, boot-making, blacksmith's work, tailoring, cane-work.	...
68	„	Damoh . .	Private, Christian Mission Orphanage.	1900	Shoe-making, carpentry, weaving, blacksmith's work, tailoring.	...
69	„	Seoni-Malwa Hosangabad.	Private, Friends' Mission Orphanage.	1899	Carpentry, weaving, shoemaking, tinsmith's work, tailoring, gardening, agriculture.	...

Superintendent's qualifications.	Teacher's qualifications.	Average attendance.	Number of boys passed out annually.	Net cost per annum.	Gross cost per annum.	Government grant per annum.	Municipal or Board grant.
				£	£	£	£
...	...	77	...	162	...	...	...
School of Art certificate.	...	98	6	2,200	...	...	...
...	Bazar Mistris	34	5	800	...	...	...
School of Art certificate.	School of Art certificates.	70	...	2,135	...	...	...
...	...	150	...	...	...	...	...
...	...	50	...	...	...	...	...
...	...	...	...	...	...	...	...
...	...	5	2	...	...	...	...
Experience in the Education Department.	...	...	...	...	...	...	...
...	...	72	...	...	...	...	...
...	...	65	...	...	...	...	...
...	...	45	...	...	...	...	...
...	...	286	...	...	...	...	...
...	...	50	...	...	...	...	...
...	...	235	...	...	...	...	
...	...	165	...	...	...	...	...
...	...	122	...	...	...	...	...
...	...	144	...	...	...	...	...
...	...	98	...	...	...	...	...
...	...	225	...	...	...	...	
...	...	343	...	...	...	...	...
...	...	412	...	...	...	...	...

Serial number.	Province.	Place.	Status of School.	Date of formation.	Trades.	Superintendent.
70	Central Provinces.	Hoshangabad .	Private, Friends' Industrial Works.	1892	Carpentry, blacksmith's work, gardening.	...
71	„	Saugor . .	Private, R. C. Orphanage.	1880	Carpentry, tailoring, weaving, masonry, candle-making, gardening, agriculture.	...
72	„ .	„ . .	Private, Swedish Mission Orphanage.	1898	Carpentry, blacksmith's work, book-binding, shoemaking.	...
73	„ .	Jubbalpur .	Private, Gokul Das' Cotton Mill Orphanage.	1898	Spinning and weaving. .	...
74	„ .	„ .	Private, Wesleyan Mission Orphanage.	1897	Weaving, carpentry, spinning, gardening.	...
75	„ .	Patpara Mandla.	Private. Church Mission Orphanage.	1898	Carpentry, blacksmith's work, gardening, and farming.	...
76	„ .	Nagpur .	Private, St. Francis-de-Sale's Industrial School.	1899	Carpentry, blacksmith's work, gardening, farming.	...
77	Bombay .	Bombay .	Reay Art School, Government.	1891	Carpet-weaving, pottery, metal-work, wood-work.	...
78	„ .	Poona . .	College of Science, Government.	1854	Carpentry, smith's work, moulding.	...
79	„ .	Dharwar .	Government Training College.	1889	Carpentry, smith's work .	...
80	„ .	Hyderabad	Government Technical School.	1888	Carpentry . . .	...
81	„ .	Yerrowda .	Government Reformatory School.	1889	Carpentry, smith's work, carriage-painting and varnishing, book-binding, gardening.	...
82	„ .	Ratnagiri .	Local Board, School of Industry.	1879	Carpentry, cabinet-making, inlaying and carving, turning and polishing.	...
83	„ .	Tatti, Karachi	Local Board, Technical School.	1889	Carpentry, turning, cane-work.	...
84	„ .	Kandiaro, Hyderabad.	Do. .	1887	Carpentry, turning, carving, smith's work, cane-work.	...
85	„ .	Ubanro, Shikarpur.	Do. .	1893	Carpentry . . .	...
86	„ .	Khairpur, Dhurki, Shikarpur.	Do. .	1893	Smith's work . .	...
87	„ .	Poona . .	Municipal Board, Technical School.	1889	Carpentry . . .	...
88	„ .	Pandharpur .	Municipal Board, School of Industry.	1878	Do. . . .	Passed pupil of Victoria Jubilee Institute.
89	„ .	Dhulia . .	Municipal Board, Industrial School.	1896	Do. . . .	...
90	„ .	Surat .	Municipal Board, Purekh School of Art.	1878	Carpentry, smith's work .	...

Superintendent's qualifications.	Teacher's qualifications.	Average attendance.	Number of boys passed out annually.	Net cost per annum.	Gross cost per annum.	Government grant per annum.	Municipal or Board grants.
				£	£	£	£
	...	28	...	...	...	...	...
	...	205	...	...	...	...	...
	...	95	...	...	...	...	...
	...	17	...	...	...	...	...
	...	63	...	...	...	...	...
	...	60	...	...	...	...	...
	...	60	5	...	...	...	...
In this Province a good many of the Superintendents are passed students of the Victoria Jubilee Technical Institute.	The teachers are either selected workmen, or passed students of the Victoria Jubilee Technical Institute and the Poona College of Science.	101	...	...	...	...	...
		123	30	...	...	...	...
		90	...	...	...	...	...
		56	...	...	...	...	...
		129	...	...	...	...	...
		181	10	...	...	...	...
		28	6	...	...	...	...
		56	8	...	...	...	...
		51	5	...	...	...	...
		27	2	...	...	...	...
		27	6	...	...	...	...
	Ex-pupils of this school.	114	8	4,000	...	1,000	3,000
	...	13	...	...	...	...	...
	...	38	13	...	...	...	...

Serial number.	Province.	Place.	Status of School.	Date of formation.	Trades.	Superintendent.
91	Bombay .	Hyderabad .	Municipal Board, Technical School.	1899	Carpentry . . .	...
92	„ .	Umarkot .	Do. .	1888	Carpentry and smith's work	...
93	„ .	Yacobabad .	Do. .	1889	Do. do. .	...
94	„ .	Bombay .	David Sassoon Industrial Reformatory.	1857	Carpentry, smith's work, painting, fitting, and turning, embroidery, tailoring, shoe-making.	...
95	„ .	„ .	Aided, Victoria Jubilee Technical Institute.	1887	Mechanical engineering, cotton manufacture, metal, enamelling, aluminium working, locomotive driving.	...
96	„ .	Poona .	Aided, F. C. M. Industrial School.	1878	Printing . . .	...
97	„ .	Sirur . .	Aided, Deccan Industrial School.	1879	Carpentry . . .	...
98	„ .	Poona . .	Aided, Cowley Father's Industrial School.	1877	Do. . . .	...
99	„ .	Baramati .	Aided, Industrial School.	1899	Do. . . .	...
100	„ .	Ahmednagar .	Aided, S. P. G. .	1889	Carpentry, smith's work .	...
101	„ .	„ .	Aided, Sir Dinshaw Manekji.	1892	Carpentry, metal-work, weaving, carpet-making.	...
102	„ .	Karachi .	Aided, Sind Madrasa.	1887	Carpentry . . .	...
103	„ .	Sukkur .	Aided, Technical School.	1894	Carpentry, turnery, smith's work.	...
104	„ .	Parel . .	Unaided, Parri Orphanage.	1888	Carpentry, cane-weaving, tailoring, shoe-making, painting.	...
105	Madras .	Madras . .	Government School of Art.	1850	Metal-work, silver and jewellery work, cabinet-making, carpet-weaving, cotton-weaving, pottery, engraving, modelling.	Mr. A. Chatterton, B.Sc.
106	„ .	Chingleput .	Government Reformatory.	1887	Carpentry, blacksmith's work, metal-work (aluminium), weaving, tailoring, tape-making.	Mr. J. P. Lewis.
107	„ .	Madura .	District Board, Technical Institute.	1890	Cabinet-making, metal-work, blacksmith's work, rattan-work.	Formerly Superintendent of the District Board Normal School.
108	„ .	Tinnevelly .	Do. .	1895	Carpentry, blacksmith's work, rattan-work.	Do. .
109	„ .	Bezwada .	District Board, Industrial School.	1890	Carpentry, blacksmith's work.	Do. .
110	„ .	Madras . .	Aided, Anjuman Majid-i-Ahl-i-Islám.	1884	Carpentry, embroidery, tambour.	Pensioned workman of the Gun-Carriage Factory.
111	„ .	Karar . .	Aided, Wesleyan Industrial School.	1884	Cabinet-making, blacksmith's work, weaving, rattan.	European .
112	„ .	Nazareth .	Aided, Art Industrial School.	1878	Carpentry, cabinet-making, blacksmith's work, fitter's work, weaving, tailoring, lace-making, embroidery.	...

Superintendent's qualifications.	Teacher's qualifications.	Average attendance.	Number of boys passed out annually.	Net cost per annum.	Gross cost per annum.	Government grant per annum.	Municipal or Board grants.
				£	£	£	£
...	...	18	...	...	...	...	...
...	...	35	6	...	...	...	...
...	...	32	6	...	...	...	...
...	...	206	...	...	...	...	...
...	...	127	20	...	...	...	...
...	...	5	2	...	...	...	...
...	...	35	7	...	...	...	...
...	...	12	4	...	...	...	...
...	...	11	...	...	...	...	...
...	...	19	6	...	...	...	...
...	...	109	100	...	...	...	...
...	...	62	...	...	...	...	...
...	...	48	3	...	...	...	...
...	...	21	10	...	...	...	...
...	...	374	...	33,269	50,591	...	...
...	...	153	...	11,265	14,299	...	...
No practical qualifications.	...	135	...	6,509	14,740	4,870	1,000
Do.		46	...	6,844	8,325	2,464	...
Do.		32	...	3,430	3,721	550	200
Pensioned workman of the Gun-Carriage Factory.	In nearly every case the instructors are workmen trained in some European managed workshop, or *ex*-pupils of industrial schools.	93	...	6,436	7,852	979	2,988
Practical workman		64	...	7,646	17,667	4,423	103
...		140	...	9,210	10,715	2,163	390

Serial number.	Province.	Place.	Status of School.	Date of formation.	Trades.	Superintendent.
113	Madras .	Manamadura .	Aided, American Mission Industrial School.	1897	Carpentry, blacksmith's work.	...
114	„ .	Arni .	Do.	1887	Carpentry, tailoring, printing, blacksmith's work, weaving, cotton-weaving.	European .
115	„ .	Adyar . .	Aided, St. Patrick's Orphanage.	...	Carpentry . . .	...
116	„ .	Puttur . .	Aided, S. P. G. Boys' School.	...	Do. . .	...
117	„ .	Tuticorin .	Aided, Melur Technical School.	...	Do. . . .	...
118	„ .	Mel Tekkan, S. Arcot.	Private, Danish Lutheran Mission Industrial School.	...	Do. . . .	...
119	„ .	Beripet, Nellore	Private, Industrial School.	...	Do. . . .	...
120	„ .	Vellore . .	Private, Anjuman Isha Athal Hassanath Industrial School.	...	Do. . . .	...
121	„ .	Vaniyambadi .	District Board, Class	...	Do. . . .	...
122	„ .	Ootacamund .	Government, Lawrence Asylum.	...	Do. . . .	...
123	„ .	Madras .	Aided, Industrial School.	...	Do. . . .	...

Superintendent's qualifications.	Teacher's qualifications.	Average attendance.	Number of boys passed out annually.	Net cost per annum.	Gross cost per annum.	Government grant per annum.[c]	Municipal or Board grants.
				R	R	R	R
...		59	...	745	2,578	96	...
Practical workman		68	...	6,720	10,562	1,800	...
...		...	...	...	...	...	...
...		...	...	...	...	...	...
...	In nearly every case the instructors are workmen trained in some European managed workshop, or *ex*-pupils of industrial schools.	...	...	...	...	...	...
...		...	...	...	...	...	...
...		...	...	...	...	...	...
...		...	...	...	...	...	...
...		...	...	...	...	...	...
...		...	...	...	...	...	...
...		...	...	...	...	...	...

APPENDIX IV.

Cawnpur Industrial School.

SKETCH OF PROPOSED CONSTITUTION.

BY THE PRESIDENT.

Objects.

1. The School is designed to provide a practical training for European and Eurasian boys in order that they may be fitted for employment or further training in railways, workshops, factories, mills, and commercial work generally.

Government.

2. The School will be managed under the orders of Government by a Board containing representatives of—

the Civil Authorities;
the Public Works Department;
the Cawnpur Manufacturers;

with the Superintendent of the School as Secretary.

Site.

3. The most suitable site for the School appears to be the land now occupied by the old post office (for rent), a bungalow now rented by the Executive Engineer, Fatehpur Division, L. G. C., an office and some cultivated land, situated north-west of the Memorial Gardens; bounded on the north by the masonry lined main drain, on the south by the road from the Gardens to the rear of the Bank of Bengal, and on the east by the curved road from the Collector's house to the Gardens. The area is about 14 acres, and is sufficient for the purpose. This site is high, well drained, and, though at present unsightly, can be improved to a neat appearance by judicious terracing. The church and most of the mills are close at hand. This site will have to be acquired, as it is all private property.

Departments.

4. The following departments might be started at first:—

Commercial	Accounts. Correspondence. Shorthand. Typewriting.
Mechanics	Electrical work. Steam and Oil. Wood-work. Metal-work.
Trades	Leather specialized. Wool ,, Cotton and Jute. Dyeing. Plumbing.

With the exception of the "Commercial," the sub-heads of the departments can be with advantage still further specialized in practice. It will be quite sufficient to teach each boy the special branch he proposes to take up in practice; indeed, it is only by specializing that success can be attained, as general hands are not valued in the trades.

Number of students and sources of supply.

5. It is probable that a three years' course will in general be required in the School, and in this case, if the number of admissions was fixed at 50 per annum to begin with, there would usually be 150 in attendance, when the School was in full swing. This number may, however, be reduced by the elimination of students found unsuitable for training by after-experience of their characters, and it should be the leading principle of the School to remove such students as soon as their incapacity has been discovered. Students may be expected to join in large numbers from Cawnpur itself, of which some may wish to be day boys, from Lucknow, Jhansi, Allahabad, and the various hill schools. The class it is particularly desired to attract are those who have not sufficient attainment or opportunities to join the Roorkee classes, but who still desire to earn a living in a practical profession or trade.

Staff.

6. The permanent staff will consist of a Superintendent with the qualifications of a Mechanical and Electrical Engineer, assisted by Instructors in—

Applied Mathematics,
Drawing,
Experimental Science,

and by Foremen in any trades taught within the school building, with the staff necessary for minor discipline, commissariat, and clerical duties. The head of the clerical staff should be qualified to assist the Applied Mathematics Instructor in instruction in commercial work, and his other duties should be restricted so as to leave time for teaching.

The Superintendent, in addition to general superintendence, would take the students in electrical work, when the instruction was beyond the scope of the Foreman, and in the

experimental branches of steam and oil, and he would generally supervise and assist in the other branches.

The Instructor in Applied Mathematics would take the mathematical teaching generally.

Drawing would be taught to all students.

The Instructor in Experimental Science would deal with the theoretical portions of all the subjects as far as his branch was concerned, including Dyeing and Sanitation (for Plumbers).

It would be the duty of the three senior members of the staff to work up the recorded theoretical information on leather, wool, cotton, and jute, and to give instruction regarding these materials.

At first three Foremen would be sufficient, *viz.*, one each for metal-work, wood-work, and plumbing.

Installations and Equipment.

7. The following buildings would be required :—

School-house.

Workshop and Store.

Mess and Recreation-rooms.

Quarters for Staff.

„ „ Students.

„ „ Petty Establishment.

Cricket, Football, and Hockey grounds should also be prepared.

The School-house should have five class rooms properly fitted and a centre hall capable of holding all the students, an office for the Superintendent and one for the Clerical Staff, Lavatory, Store rooms, etc.

The workshop need have no power tools, if the shops now existing in Cawnpur are, on detailed examination, found suitable places for outside training, but a small oil engine for electrical work will be required. The workshop school training should be a carefully regulated manual course only, except in the case of plumbing, which must be wholly taught in the School. A store for spare tools and materials should be combined with the shop.

Mess and Recreation-rooms.—The senior students might well mess together on the principles observed for the Upper Subordinate Mess, Roorkee, where the expenses are ₹15 per mensem for messing and ₹2 for subscription. Junior students would probably have to be more under supervision. It would be well, therefore, to have the mess-room used at different times; a recreation-room for papers, books, and a small library should be included.

Quarters.—It will only be necessary for the Superintendent and the Disciplinary Staff to live on the premises, so two houses will suffice. The students' quarters should be arranged so that each 3rd year student has a room for himself; 2nd year live 3 in a room, and 1st year 9 or 10 in a room. As a proportion will be day boys, 120 quarters should suffice.

Preliminary qualifications.

8. The European and Eurasian students joining this School should be statutory natives of India and unmarried; they should have completed their general school education, bear a good character, pass a medical examination, and an entrance test of a standard about midway between the Roorkee Upper and Lower Entrance Examination. Successful candidates should be selected in the order of their standing at this examination.

The age limits might be 14 to 21, but there does not appear to be any reason for refusing admission to older men.

Students should be able to show that they can maintain themselves at the School.

Course of training in School.

9. The actual detail of the course of training in the School might be laid down by the Principal of the Roorkee College. It should be strictly specialized for each departmental sub-head. In theoretical and experimental work the following subjects should be included :—

Drawing.	Elementary Mechanics.
Arithmetic.	Mechanism.
Algebra.	Estimating.
Geometry.	Accounts.
Mensuration.	Heat and Steam.
Trigonometry.	Chemistry of materials.
Materials.	
Electricity.	
Sanitation.	
Accounts, Correspondence, Shorthand, Typewriting } for Commercial Classes.	

In practical work the work to be done should include manual training on carefully arranged courses gradually merging into specialized branches as far as can be done without power machines. Plumbing in all its branches must be wholly taught in the School, as no outside training is available in Cawnpur.

Outside training.

10. The system of the school anticipates after the first year that the student will spend half the day at School and the other half at some workshop, mill, or manufactory, learning his trade as a workman from the bottom up. The head of the firm taking charge of the student should have full control of this training, if it is to be effective; unless this can be provided, there will be no use in starting the School.

Final training.

11. After completion of the School course and preliminary training in outside shops, the apprentice should be granted an incomplete certificate and be bound apprentice to the firm in which he is to complete his training. His certificate should be completed by the head of the firm if his character and qualifications are satisfactory; it will then have a market value. The period of this final training will vary for different trades. The apprentice will be in a position to earn pay according to his capacity during his apprenticeship.

Fees and scholarships.

12. It is certainly the proper principle to charge fees for training in a school of the nature proposed. The amount of the fee for each class should be fixed after further inquiry into the circumstances of the students who are likely to avail themselves of the opportunities put before them. The extension of the fee system has had excellent results at Roorkee.

It will be most injudicious to provide a certain number of scholarships which should be the reward of merit. Prizes for final results might also be given.

Expenses of students.

13. The outfit of books, drawing instruments, and private tools will in all probability cost ₹80 to ₹100. The current monthly expenses should not exceed an average of ₹25 exclusive of the school fees.

Approximate estimate.

14. Capital—

		₹
Land, say 14 acres, at ₹1,500 per acre		21,000
Buildings—	Square feet.	₹
School-house	6,000	
Workshop	5,000	
Mess and Recreation	2,000	
Students' Quarters	3,000	
TOTAL	16,000 at ₹2-8	=40,000
Superintendent's bungalow		10,000
Disciplinary staff's quarters		5,000
Petty staff's quarters		3,000
Recreation grounds and terracing		6,000
Tools and plant		20,000
Furniture		5,000
		89,000
TOTAL CAPITAL		1,10,000

Annual expenditure—	₹	Mean.	Monthly.
Superintendent	500—750	625	625
1 Instructor (Example Section)	250—400	325	325
2 Instructors („ „)	150—250	200	400
1 Foreman (Plumbing)	100—200	150	150
2 Foremen	50— 80	65	130
Disciplinary staff	80—100	90	90
Clerical (including Instructor)	200—250	225	225
Petty establishment		...	100
Medical charges		...	50
Waste of materials		...	150
Up-keep of grounds		...	50
Contingencies (books, stamps, etc.)		...	80
TOTAL			2,375×12=28,500

Pensions and exchange compensation are not included. The provision of residence for the staff living outside the School requires consideration. The Superintendent should be obtained from Europe, the Instructors from the Engineer and Upper Subordinate class, Roorkee. The Plumbing Foreman should be obtained from Europe on higher pay than that shown for a short term, to be replaced by a trained student.

APPENDIX V.

Note on the Aluminium Department of the Madras School of Art.

By Mr. A. Chatterton.

The following note is explanatory of the financial position of the Aluminium Department of the School of Art. The Department was started on the 1st April 1898, and the sales, receipts, and expenditure since then have been as follows :—

Year.	Sales.			Receipts.			Expenditure.		
	₹	a.	p.	₹	a.	p.	₹	a.	p.
1898-99	50,791	5	7	44,621	13	9	48,814	7	5
1899-1900	1,10,657	10	5	97,816	3	6	94,174	0	8
1900-1901	1,52,202	5	1	1,32,757	5	9	1,95,033	13	5
1901-January 31st, 1902	1,56,400	2	6	1,31,840	13	8	2,08,369	8	2

For the first two years the amount of Government capital invested in the business did not at any time exceed ₹25,000, as the financing of the industry was done by the agents of the British Aluminium Company. Experience proved that this was a very expensive way of doing business, and in 1900-1901 I began to take over the stock of metal in the agent's hands at reduced rates, and in consequence expenditure was greater than receipts. At the present time the stock of metal I hold is in excess of my requirements, and I shall gradually reduce it, or, if business expands, it will prove sufficient to carry on operations to the value of from 2½ to 3 lakhs a year.

The following statement is compiled from the accounts up to the 30th September 1901, the last date on which the stock was valued :—

Liabilities.	₹	a.	p.	Assets.	₹	a.	p.
Net cost to Government from April 1898	80,534	0	6	Stock in hand	93,650	0	4
Sundry Creditors	26,372	4	6	Sundry debtors	44,141	8	2
Wages, Establishment, Contingencies, etc.	2,183	13	7	Articles presented to public institutions	1,302	1	11
Advance	430	0	0	Tools and plant	4,929	15	3
	1,09,520	2	7		1,44,023	9	8
Balance net profit from April 1898	34,503	7	1				
	1,44,023	9	8		1,44,023	9	8

The profit in 3½ years' working is ₹34,503-7-1; but against this item a number of charges should be made to arrive at an accurate account.

The following items have been omitted :—

1. Interest on capital. The capital in the business may be taken as follows :—

	₹		₹	
1898-99	25,000	6 per cent. interest	1,500	
1899-1900	25,000	„ „	1,500	
1900-1901	75,000	„ „	4,500	
1901-1902	1,00,000	„ „	3,000	for six months.
		Total	10,500	

2. No charge has been made on account of superintendence, as during the whole time my pay has been charged to other heads. During the first three years I was Professor of Engineering, and I ran the aluminium business in my spare time. During the last 12 months I have been in charge of the School of Arts, Inspector of Technical Schools, and on special duty to develop Indian industries in addition to the charge of the Aluminium Department. I propose, therefore, an allowance of ₹500 per month for the whole time as a fair charge against the Aluminium Department. For three and a half years this would amount to ₹21,000.

3. No charge has been made for rent or taxes.

The following would, I think, be a fair charge in each year, as much of the work has been done in sheds, the cost of erecting which has been charged in the accounts.

	₹		₹	
1898-99	50	per mensem.	600	
1899-1900	75	„ „	900	
1900-1901	100	„ „	1,200	
1901	125	„ „	750	(six months.)
		Total	3,450	

4. Printing and Stationery have been omitted. These items for each period may be taken approximately as follows :—

	₹	
1898-99	250	
1899-1900	750	
1900-1901	1,500	
1901	900	(six months.)
TOTAL	3,400	

The final statement of profit and loss would therefore be—

	₹	a.	p.
Gross profit as per accounts on 30th September 1901	34,503	7	1
Deduct—	₹		
Interest	10,500		
Superintendence	21,000		
Rent	3,450		
Stationery and printing	3,400		
TOTAL	38,350		

There is, therefore, a loss of ₹3,850 on the whole period if interest at 6 per cent. be taken into account, but if that item be deducted, the profit would be ₹6,650 or sufficient to pay nearly 4 per cent.

It must be remembered that the Aluminium Department was started not with the object of training metal-workers, but to create a market in India for aluminium, in the hope that it would ultimately be large enough to induce private enterprise to undertake the manufacture of the metal itself in the country using water power to generate the electric current. So far we have succeeded in creating a demand for about 100 tons a year, and when the consumption reaches four times its present amount, I think it will be practicable to start aluminium works with a certainty that they will be commercially successful. My object then was to sell as much metal as possible and not to make a profit. All that I have ever aimed at was not to undersell private manufacturers, and I could have made a much larger profit if it had been desirable at the expense of the main object of my work. A large amount of money has had to be spent in training metal-workers, in carrying out experiments, and on establishing agencies, but this work we have done at a very much smaller cost than any private agency could have done it. For instance, the prestige attaching to a Government Department has helped us a good deal, and, again, no private firm could have obtained the services of a Superintendent to carry on the whole business at the rate I have allowed, *viz.*, ₹500 per month. Yet this is a charge which could only be fairly debited to the Department during the last 12 months, as previous to that time I had to carry on the whole work without receiving any pay beyond that attached to my permanent and actual appointment as Professor of Engineering. The most difficult part of the work was done during the first three years, and has resulted in the establishment of a business which could easily be made to yield a return of 15 per cent. on the capital invested in it.

We have had three fairly distinct markets to develop—(1) in European utensils, (2) military equipment, (3) the native market. On each of these I should like to offer a few remarks: (1) The European market developed very rapidly, and the business has always been very profitable, as prices were practically controlled by those of imported goods. It was easy to undersell these and yet obtain a good profit. (2) For military equipment aluminium was very much discredited by the unsatisfactory results obtained in continental armies at the time we started manufacturing. Our prices had to be fixed at rates which would compete with those for the brass and copper utensils almost universally employed. Native regiments are not wealthy, and it was necessary, if the advantages of aluminium were to be obtained for them, that the cost of the change should be reduced to the smallest possible limit. Prices therefore were fixed as low as was consistent with making enough to cover working expenses completely. The final result has been eminently satisfactory, as the Indian army now uses very large quantities of aluminium, and a considerable saving in the weight of its *impedimenta* has been effected, whilst at the present time we are able, through the increased efficiency of our methods of work, to turn out military equipment at a price which yields a moderate profit. (3) The native market is by far the most important, but as yet it has been opened out to a very slight extent, and any considerable extension of business must be mainly in this direction. To induce natives to buy and test the value of aluminium for themselves, it has been necessary to sell at the lowest possible rate, and so far, I should think, we have probably lost money over native business. Not very much, it is true, and at the present time, probably, we are making a small profit which may be expected to slowly increase. The loss has mainly been due to the expense of selling. Most of the agencies we have opened out have never paid their expenses, and the sales in any one locality are so small that we have to allow very high rates of discount or commission to the people who have taken up the business of selling our wares. As a typical instance, I might mention that at the Madras Fair held last December we put up a booth and in four days sold about ₹1,100 worth of goods to natives, and upon these there was a profit of probably ₹200, but our expenses were roughly ₹300, and there was a dead loss of ₹100. It was a cheap advertisement, and has undoubtedly proved of value in bringing the metal into the homes of natives. The Indian Aluminium Company does very little native trade, and the main

work which the Aluminium Department has yet to do is to build up this trade. When that is done, its original object will have been achieved, and I should then recommend that no more work be undertaken than will be necessary for efficient practical instruction in a school of metal-work in which all metals in daily use in India, except iron, will each receive adequate attention.

The business of the Aluminium Department is conducted on a cash basis, and we make very few bad debts, but our outstandings at the present time amount to ₹55,000. Of this, ₹25,000 is due by the Indian Aluminium Company for metal and manufactured goods supplied to them, and the rest is due from Government Departments, Regiments, and large business houses with whom we have dealings, and a few officers employed in Government service. The arrangements I have made will enable me to reduce these outstandings to probably ₹30,000 by the end of the financial year, which is about the minimum on which it is practicable to work. Government provides at the beginning of the year a certain sum (₹2,35,000 for the present year) for expenditure during the year and budgets for corresponding receipts. In practice it becomes convenient to expend money in the early part of the year and get it back again towards the end. All our calculations for this year's work have been upset owing to the postponement of an order for machinery sent to the India Office in December 1900, consequent upon the uncertainty as to the views of the Government of India regarding the development of the enterprise. If this machinery had been received in June or July 1901, I think it is probable our sales now would have been very much greater, as it would have enabled us to have reduced prices considerably for certain articles in large demand among natives. The delay is not a serious matter from a Government point of view, but it has rendered it impossible to realize our budget forecasts as to sales. Of course, in a private enterprise the delay would mean a loss of money which would seriously affect dividends. I mention these facts because I consider that an undertaking conducted by Government cannot be fairly judged as to its financial results by the ordinary methods which are applicable to commercial concerns.

ALFRED CHATTERTON.

SCHOOL OF ARTS,
1st February 1902.

Detailed statement of charges from April 1898.

	Materials.	Wages of workmen.	Tools and plant.	Contingencies.	Establishment.	Travelling allowance.	TOTAL.
	₹ a. p.	₹ a. p.	₹ a. p.	₹ a. p.	₹ a. p.	₹ a. p.	₹ a. p.
1898-1899 .	30,457 15 8	17,089 12 9	510 8 9	756 2 3	...	...	48,814 7 5
1899-1900 .	56,523 12 9	31,052 4 6	1,742 2 10	2,908 15 10	772 12 1	1,174 0	94,174 0 8
1900-1901 .	1,35,977 3 9	43,101 4 11	4,255 6 6	5,530 12 2	6,161 4 1	7 14 0	1,95,033 13 5
April 1901 to January 1902	1,59,711 3 8	40,394 5 7	302 7 6	4,407 8 5	2,809 7 0	744 8 0	2,08,369 8 2
	3,82,670 3 10	1,31,637 11 9	6,810 9 7	13,603 6 8	9,743 7 2	1,926 6 8	5,46,391 13 8

APPENDIX VI.

Guilds.

1. Mirror of Goldsmiths.
2. Handbook of "Chiteras."
3. Rules of Lahore Guilds.
4. Letter from Raja Peary Mohun Mukerji.
5. Letter from Messrs. Dass & Co.
6. Enquiry by Mr. Moreland.
7. „ by Mr. Padshah.

1.—Mirror of Goldsmiths or the Rules and Regulations of Goldsmiths in the Punjab.

The 'Mirror of Goldsmiths' contains the proceedings and minutes of three different meetings of the goldsmiths of Lahore, held on the 9th and 17th of February 1889 and on the 3rd of August 1894. The object of these meetings was to organize a Committee for helping the poor, destitute orphans and widows in the community; to lay down certain rules and principles for the guidance of the members; to fix the wages charged by goldsmiths for making various ornaments of gold and silver, and to devise other means for improving and bettering the condition of fellow-workmen.

The first meeting was held on 9th February 1889, in which the wages charged for making various ornaments were fixed, and it was resolved that no shop-keeper should engage a goldsmith who owed money to the person who engaged him last. If he does so, he shall be held responsible for all the debts of the person whom he engages.

At the second meeting, which was held on February 17th, 1889, Bhai Jawala Singh was required to lay before the Deputy Commissioner any suggestions for the welfare of the community and their dealings with 'sarafs' (dealers in gold and silver). Bhai Jawala Singh drew up, accordingly, a scheme and laid it before the Deputy Commissioner, who was pleased to promise to pay particular attention to it and help the Committee in every way.

The third meeting was held on August 3rd, 1894. This meeting was the grandest of all meetings held till then, and was attended by 266 members (Hindus and Muhammadans), who fixed the wages charged for making various ornaments, and made the rules and laid down principles for the guidance of the members and got them printed. A perusal of the preface, the principles, and the rules, and of the duties of the President and the Directors, will clearly show the objects of the Committee.

Preface.

This book ('Mirror of Goldsmiths') has been published for the benefit of the public. The disadvantages of not knowing the true wages charged by goldsmiths for making various ornaments of gold and silver are well known, and so, by the unanimous consent of all the brethren, exact wages to be charged for making various ornaments have been fixed and cannot be increased or decreased.

The object with which the book has been published is to help those who have had very little chance of having ornaments made, so that they may know the probable cost of ornaments and the wages charged by goldsmiths for making them.

All the brethren are requested to observe and act upon the principles and rules given below, in order that every one may have full confidence in their honesty, truthfulness, and integrity, and that no one may have any chance to complain against them.

A member who fails to observe the principles and the rules laid down herein for his guidance shall have to pay a fine to be imposed by the Committee, and shall, in case of continuing the prohibited practice, be excommunicated and no brother goldsmith will have anything to do with him unless and until he were to promise to bind himself to observe and act upon the rules and the principles laid down and give up the practice that caused the displeasure of his fellow-brethren. Every goldsmith whose name has been printed in the book has agreed to act upon the principles and observe the rules laid down in the book, and has signed the document.

A meeting of the Committee will be held on Naumi, the ninth day of every Hindi month, and an annual meeting will be held on the 29th of Magh (February) every year.

Principles.

I.—To try to make the community honest, truthful, and well-meaning in profession.

II.—To try to better the condition of the community by helping the poor, destitute orphans and widows in the community.

III.—Not to make ornaments of alloyed silver for any 'saraf.'

Rules.

I.—This book will be modified every year with the approval of the Committee, and corrections made where deemed necessary.

II.—There will be ten office bearers and a peon to carry on the work of the Committee.

The duties of the President and the Directors are as follow :—

PRESIDENT.

The President will try to disseminate the principles, attend every meeting, and help the Committee in every possible way. He shall have a casting vote, and no one shall be allowed to speak without his permission.

DIRECTORS.

The Directors shall be responsible for the conduct of all the members, and see that the principles and rules laid down in the book are duly observed by each individual member, and report to the Committee the names of those who violate them. They shall also try to enlist other goldsmiths coming to Lahore from different parts of the province and to report to the Committee if they do not join them. They will also devise means for improving and bettering the condition of the community.

At the end of the book the names of a few goldsmiths are given who are regarded as authority for weights and rates of ornaments.

A note is also given to the effect that the wages of a goldsmith sent for to work at the house of any gentleman will be a quarter as much again as the ordinary wages.

The book concludes with the notice of a factory to be opened by Rama Nand and Fazal-ud-din of Lahore, and worked on the principle of Co-operative Stores. Goldsmiths from other parts of the province are invited to point out any errors they may notice and offer suggestions for improvement.

2.—A HANDBOOK OF 'CHITERAS' (ENGRAVERS AND REPOUSSÉ WORKERS) IN THE PUNJAB.

The Handbook of 'Chiteras' contains rules and regulations for the guidance of the workers, the wages charged for engraving and repoussé work done in gold and silver ornaments; and at the end signatures of 29 workers who agree to observe the rules and regulations herein laid down. A note is given at the end to the effect that wages for work of a superior quality will be higher than those given in the Handbook.

The rules and regulations run as follows :—

I.—That every engraver and repoussé worker is bound and shall be bound, on oath of parents and God, to observe the rules and regulations laid down in the Handbook for his guidance.

II.—That no engraver and repoussé worker shall work for a goldsmith or 'saraf' (dealer in gold and silver, both bullion and ornaments) who finds fault with the work of any of his fellow-workers. The worker whose work has been rejected will inform all the brethren of the doing of the goldsmith or 'saraf' in question. If he fails to do so, he shall have to pay a penalty of R1-4-0. Any other worker who receives work from such a goldsmith or 'saraf' shall also pay the same penalty of R1-4.

III.—That no engraver and repoussé worker shall accept less wages than those put down in the Handbook; if anyone does so, the Committee will, on the proof being furnished, fine the person, who infringed the rule, R5.

IV.—That no engraver and repoussé worker shall condemn the work done by a fellow-worker. If he does so, he shall have, on the proof being furnished, to pay a penalty of R2-8.

*V.—That no engraver and repoussé worker shall take in an apprentice of any class other than his. If he does so, the Committee shall impose a fine which they consider fit, and dismiss the apprentice.

VI.—That no engraver and repoussé worker shall take in an apprentice without the consent of the Committee. If any one does so, the Committee shall fine him and dismiss the apprentice.

3.—RULES OF SOME TRADE GUILDS AT LAHORE.

i.—Silk-weavers' (Daryai-báf) *Guild.*

1. This was established eight or ten years ago at the instance of some Bombay merchants who visited Lahore at that time.

2. The rates have since been fixed 50 per cent. higher than those prevailing previously.

3. Payment for work is demanded (and received) always in advance.

4. The weavers are a gradually diminishing class, partly on account of the establishment of the Guild and partly because of keener competition with the stuff imported from abroad.

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* This rule clearly shows the professional prejudices and narrow-mindedness of Indian artisans.—J. CLIBBORN.

ii.—Metal-workers' (Tatherâs) *Guild.*

1. The rates for different kinds of utensils are fixed.

2. All work is stopped for seven days on the occasion of the death of a fellow-artisan residing at Lahore, but one day's stoppage is observed for a *muffassil* brother.

3. Infringements of these rules are punishable by fines amounting to R4 or R5.

iii.—Utensil-sellers' (Kaserâs) *Guild.*

1. Rates are fixed with the metal-workers, as also the quality of the work turned out. Inferior work is discounted for at fixed rates.

2. Business must be stopped for one day on the occasion of the death of a brother residing at Lahore.

3. The *Ikádasi* (eleventh day of the moon) and the *Somvatimavas* must be observed as holidays by all.

iv.—Ironmongers' Guild.

1. Rates are fixed for certain classes of work, but not for all.

2. The compulsory holidays are the same as for the utensil-sellers.

RUCHI RAM SAHNI.

4th January 1902.

4.—Extract from letter dated 24th January 1902 from Raja Peary Mohun Mookerji, Utterpara, Bengal.

There is at present no trace of trade guilds in Bengal. The smiths, potters, carpenters, braziers, weavers, and other artisans work on their own account and settle their own terms with their employers and customers. There is no combination among them to regulate the prices of art manufactures and the hours of labour so as to enable each to secure the conditions most favourable for labour. Nor do any of them contribute a sum to a common fund for the purpose of enabling the men to resist by strikes or otherwise any attempt on the part of the employers to lower the rate of wages or lengthen the hours of labour. Anything like an insurance of tools is also wholly unknown. The consequence is that the condition of the artisans in Bengal is worse than what it would otherwise have been, a result similar to that experienced in other countries where the worst paid traders are those without unions.

2. But although there are no definitely constituted guilds or trade unions in Bengal, the members of certain trades have occasionally been known to enter into combinations among themselves for the purpose of fixing the prices of articles or the rates of daily or monthly wages. Such a combination is called a *chakra* (circle). These are, however, of ephemeral existence and not cemented by any fixed rules.

3. There has been a growing laxity of the rule restricting the admission of persons of other than the proper caste from practising a certain art. The feeling is not to exclude other castes from coming in, but not to stoop to practise an art which their ancestors never practised. A carpenter would never stoop to do the work of a weaver, but he won't have any objection to allow a man of the weaver caste to learn carpentry at his shop.

4. There is for practical purposes no trade organization in Bengal.

5. There is no indigenous trade school in Bengal. Young boys are trained at the workshops of their fathers and relatives, and although a man will train apprentices sent by a friend, he never charges a fee for the training or gives them any wages unless after a term he chooses to employ them as his partners in the business.

6. The number of learners or apprentices varies according to the nature of the business. Ordinarily it does not exceed half a dozen.

7. The only other remark I desire to make is that there is a large field for pointing out to Indian artisans openings for industrial enterprise. Despite their poverty, they have in some cases adopted European labour-saving appliances and improved tools. They are beginning to appreciate the value of fly-shuttle looms and casting brass in sand from wooden or metal patterns, and it would be a blessing to them and to the country if a provision could be made for their training on the method adopted in the Casanova Boy-Artisan School at Naples. But looking to the character of the people and their want of mental confidence, I am not sanguine that the trades would even form themselves into guilds for the protection of their rights.

5.—Extract from letter dated 28th January 1902 from Dass & Co., Chitpur Lock and Safe Works.

(*a*) The caste system (in other words, the Indian trade organization which existed before) ceased to have the same influence, but the several vernaculars denoting the several castes are still used to mean the particular trade which its members used to follow in by-gone days.

(*b*) At present there do not seem to exist any regular organizations, and members of any caste are allowed to enter in different trades at will.

(*c*) Regular apprenticeships for industrial training do not prevail nowadays for several reasons, and hence artisans of higher order are in insignificant minority.

(*d*) Apprentices in small numbers without much caste restriction are generally taken by workshops of private artisans, but the training received does not generally much help the apprentices to be good artisans.

Our humble selves have made the improvement of this line of metal manufacture a subject of study for the last few years, and, so far as our experience goes, it requires some sort of compulsory training of the beginners for a reasonable time and at *authorized* training places (workshops under good management, Government workshops, or industrial and art schools) controlled by Government to improve the quality of any industry and hence the condition of those following the industry.

6.—Enquiry by Mr. Moreland, Director, Department of Land Records and Agriculture, North-Western Provinces and Oudh.

Calico Printing.

1. The trade is not organized in guilds.

2. A system of apprenticeship exists by which boys learn work. They do not pay any fees to any workman for learning, but they present him with some sweetmeat when they begin to learn; as they get skilled, they earn a little money. The training is not confined to the family.

3. There is no system or custom in force by which workmen known to be specially good are selected to train boys in the work in preference to others who are not so skilful. Boys learn under their father or nearest relatives or to whomsoever they have been introduced irrespective of skill.

4. The best workmen can be induced to take more apprentices and train them thoroughly. When they have been thoroughly trained, a small honorarium should be paid to the workmen to induce them to train more boys.

The traders say that, as cotton fabrics printed at Farrukhabad with new designs are selling at lower rates than Lucknow ones, their trade is declining. New designs and patterns are required to avoid degradation of taste.

Chikan.

1. The trade is not organized in guilds.

2. The training is not confined to the family. Boys and girls learn the work from their parents or from their neighbours; and there is no regular system of apprenticeship by which they are taught work.

3. There is no system in force by which workmen known to be specially good are selected to train boys in the work in preference to others who are not so skilful.

4. The best workmen can be induced to take apprentices and train them thoroughly on receipt of a small honorarium; but as this work is largely done by poor *pardanashin* women of Lucknow and neighbouring villages, there is hardly any necessity of training more men. All that seems to be required is to increase the demand for Chikan work.

Gold and silver work.

1. The trade is not organized in guilds.

2. The training is purely in the family of gold and silversmiths; and no system of apprenticeship exists by which boys of other castes are taught work.

3. There is no system in force by which workmen known to be specially good are selected to train boys in the work. The boys learn under their father or nearest relative irrespective of skill.

4. The best workmen cannot be induced to take apprentices and train them. A good deal of adulteration of gold and silver is going on, and hence their unwillingness to take outsiders.

There is no dearth of good workmen. If demand continues good for artistic work, the industry in Lucknow will not decline.

Gold and silver lace and embroidery.

The material required for these industries is prepared by *Kandla-kash* and *Tar-kash*; the former means drawer of silver bar and the latter drawer of wire. When the material is ready the *Gata-bafs* weave the lace and the *Zardoz* makes embroidery.

1. So far as the work of *Kandla-kash* is concerned, the trade is in a way organized in guilds. There is in Chauk an institution called *Kandla-ka-chakri*, which is maintained by the lace dealers as a body, and is intended to prevent frauds by the *Kandla-kash*. The other branches of this industry are not organized in guilds.

2. The work of *Kandla-kash* and *Tar-kash* is purely confined to their families, and they teach the work to their own boys only. The work of *Gata-baf* or *Zardoz* is not confined to the family, and among them a system of apprenticeship exists by which boys are taught work. They pay no fees to the workman for learning, and they earn a little money as they get skilled.

3. There is no system in force by which skilful workmen are selected to train boys in the work. The boys learn under their father or relative or to whomsoever they have been introduced irrespective of skill.

4. Skilful *Gata-bafs* and *Zardoz* can be induced to take more apprentices and train them thoroughly on receipt of a small honorarium.

There is an extensive demand for Lucknow lace and embroidery; they give employment to a large number of persons, and there is much room for improvement. Some new designs and patterns are required to avoid degradation of taste. If this is not done, the industry will decline in course of time with spread of English education.

Brass and copper ware.

1. The trade is not organized in guilds.

2. The work is usually in the hands of *Thatheras* and *Kaseras*. They ordinarily teach their own boys or the boys of their relatives. No fee is charged for learning, and the boys earn a little money as they get skilled.

3. There is no system in force by which workmen known to be specially good are selected to train boys in the work. The boy ordinarily learns under his father or nearest relative irrespective of skill.

4. The workmen cannot be induced to take more apprentices and train them thoroughly; they might take more apprentices of their own caste.

The traders say that since a rise in the price of copper and brass and slack demand caused by hard times, the trade is declining. There will always be a good demand for brass and copper ware, as there is no European competition with this industry.

Bidri.

1. The trade is not organized in guilds.

2. A system of apprenticeship exists by which boys of the families of Bidarsaz (and not of outsiders) are taught work. They pay no fee for learning, but they earn a little money as they get skilled.

3. There is no system in force by which skilful workmen are selected to train boys. The boys learn under their father or nearest relative irrespective of skill.

4. The workmen cannot be induced to take outside apprentices and train them The trade is confined to a few Muhammadan families, and the traders say that, since two Hindus learnt their work, they have reduced prices, and the trade has been ruined. They say that some time ago the authorities of the Lucknow Industrial School enquired from them if they would train some boys of the School, but they did not agree.

Pottery.

1. The trade is not organized in guilds.

2. Ordinarily the training is purely in the family of Kumbars, and no system of apprenticeship exists by which boys learn work.

3. There is no system in force by which workmen known to be specially good are selected to train boys in the work. The boys learn under their father or nearest relative irrespective of skill.

4. The best workmen cannot be induced to take more apprentices and train them. It has been reported that a skilful potter is in the service of the Industrial School at Lucknow, who trains boys in ornamental pottery.

7.—Extract from letter from Mr. B. J. Padshah, Esplanade House, Fort Bombay, 25th December 1901.

I must at once make it clear that I am only recording my impressions derived from statements made by people I selected for this purpose; so that therefore what is set down here cannot be taken ultimately as authentic. What I have gathered seems to me of so little importance that I have not troubled to verify, which, of course, I should be glad to try to do, if you mention the particular point or points which would be of interest to you. I shall submit to you my impressions in a systematized form.

1. A complete trade-union has three several and independent aspects which it would be well to distinguish. The trade-union concerns itself with the mutual benefit of members, as in allowances for sickness, out-of-work days, accidents, old-age pensions, etc., it looks after industrial efficiency, as when it prescribes a rigid apprenticeship, educational qualifications of membership, high quality in work, or when it sends out missions to study industrial processes abroad, or finally when it establishes schools of training, evening continuation classes, etc. But

the most dramatic, because militant, aspect of trades-unionism, often considered its sole concern, is the *commercial*. The Union can help to dispose of the wares of its members to their advantage by combination. If the wares are only skilled labour, it can enforce higher wages, shorter hours of work, fixed output, restriction of competition by non-unionist men. The weapon of the union, always in reserve for this end, is a strike. If, as in the case of goldsmiths, lapidaries, peasants, there is no employer between the craftsman and the public, then the combination may regulate prices of products, not only of the products they sell, but the products they buy both for purposes of their industry, and the commodities of simple consumption. They may even attempt to buy cheaper credit. Such are the Co-operative Societies of Irish and Danish peasants. So important is this commercial aspect of industrialism that there are associations, like the American Trusts (in a partial way) and Piece Goods Merchants and Grain Dealers' Association in Bombay, which make this aspect their exclusive concern.

2 It would be interesting now to inquire which of these functions performed by an up-to-date trades-union was possible in India before the advent of the British: –

(*a*) It is easy to see that the joint family system made mutual benefit superfluous, as disbelief in co-operation on an extensive scale amid hostile castes made it impossible outside the limits of a family.

(*b*) The limits of a village or even a small town not recruiting its inhabitants from other districts enables competition to be limited by the boundaries of caste and industrial processes to be maintained by custom. Both improvement and deterioration would be usually insensible in limited time, unless craftsmen in the train of an invading army found settlements alongside of the old craftsmen. The apprenticeship would usually take the shape of the training of a son by the father and in absence of the son of a near kinsman. In this latter case the customary relation was that the apprentice was treated as a son, getting his board and raiment free, and offering himself to be sweated in return from morn till night. To this day in Madras Mr. Chatterton notices the same phenomenon. In an address delivered this month at Madras, he says: "The weavers form the bulk of the artisan community, but the workers in metal and wood are also very important. With the artisans of the building trades we need not concern ourselves, as they suffer from no direct competition, and their prosperity is entirely dependant on the well-being of the whole community. These artisans belong to well-defined castes, and their occupations are in the main hereditary, though the son of a blacksmith may become a carpenter or a coppersmith and *vice versâ*, but the son of a weaver is generally a weaver. It is difficult, if not impossible, for outsiders to become apprentices in these trades in the bazars, and what is in reality a healthy trades-union has prevented internal competition in the country from reducing the artisans to the level of the poorest agricultural population."

(*c*) Where custom regulates exchanges, there is no room for a militant organization to enforce rates other than prescribed by custom. In particular, where artisan competition is not severe, it is more easy to adulterate goods or shirk work than to force higher price or wages. The principles of co-operative credit could hardly have been understood.

3. If, then, we want traces of a modern Trade Guild, we should look to quarters where the influences above enumerated are in process of dissolution. Workmen outside the pale of caste; large towns where the competition of folk of the same caste, but originally settled in various localities and therefore hostile *inter se*, pulls down customary prices, or where a large employer or financier interposes himself between the peasant or craftsman producer and the consumer, and consequently by his large resources tends to be the master of the situation; maritime marts where imported goods make the ruling customary prices impossible; capital cities where a court and aristocracy overflowing with money inevitably select and therefore differentiate between good and bad workmen and payments made to them; foreign settlements which weaken the sway of traditional duties like those of a joint family,—it is to these we turn for indication of a new régime.

4. There is, however, an intermediate period during which the caste and Panchayet organizations are employed for other than industrial or commercial uses. The Mukhi or headman at first only arbitrates in disputes between one member of his caste and another, and his orders hence generally come to be obeyed; when, therefore, the Mukhi is won over for a candidate for Municipal honours, the whole Panchayet and caste votes for the candidate. If the Mukhi sympathizes with any movement to resist a new law or a new tax, he can and does send all his men on strike, or even riot. In Mysore, in the time of the late Maharaja, when Suchdari Iyer was new and was opposed as a Madrasi interloper, a house-tax was imposed. The merchants of the town determined to teach a lesson to the Madrasi "gang." The Yajmans (heads) of the various petas (wards) met and agreed to order all grain-shops to be closed during the Dassera festival in the hope of starving the guests of the Durbar who had been invited for the occasion. A man in ashes was sent out to recite curses on any shop that was opened till further orders So complete was the obedience according to this order that even Multani merchants in Mysore did not dare to open. The Maharaja had to personally intervene and beg his subjects not to disgrace him before his guests, and then the shops were promptly opened. Similarly, plague regulations have been resisted or at least could be resisted. So natural is this use of traditional authority that a Mukadam, the foreman supervising over a number of

workmen under our employment, comes to obtain this power on strike, riot, or to vote for particular candidates.

5. Even in the interior, as at Bhavnagar, signs of an understanding among craftsmen are observable. The masons of that town have a square where they congregate for the sale of their service; they would make it hot for any interlopers or any "black-leg" among themselves who accepted lower wages, or offered better work, or worked longer hours. At Pydhownie, in Bombay City, there are goldsmiths and lapidaries, all belonging to a single caste, who could not be induced to teach their craft to any one outside the caste and who sometimes quickly come to an understanding among themselves, before the very nose of a customer, to extort a particular price from him. Butchers have more than once in Bombay held out for prohibitive prices of mutton by a combination which had to be broken by a counter-combination. The Bombay bakers once tried a combination to supply no more than 8 loaves per rupee, a combination which was easily upset by the mere suggestion that the big bakery firms would be enabled to oust the Goanese small bakers. Every one has read of the strike of hack carriages in Calcutta, not to enforce higher fares, but to cry peace from molestation by the S. P. C. A. Inspectors. The Goanese ship-hands found that, in spite of good certificates, they were at the mercy of the contracting firms in the matter of re-engagement on board ship after a short holiday. They have now an Association towards which each member contributes an admission fee of ₹3 and a monthly fee of ₹0-4-0. Every Goanese discharged from a ship registers his name at the office on the day of his discharge, and puts himself down as a candidate for re-employment for the same post for which he holds the last best certificate. The result is that the supplying firms must engage these men in this order; they cannot plead the inefficiency of the men thus offered, because the men offer themselves only for the posts for which they hold good certificates. It appears that the Association also helps members in cases where a good certificate is withheld out of spite. If the supplying firms don't like this arrangement, they must get non-Goanese men, if they can find them. Again, there are Memon Borahs who pursue the vocation of what is called in Bombay "Jaripuranavalas," *i.e.*, men who buy cast-away things such as broken bottles, old lamps, etc. It is the practice among these people, much in the fashion of vagabonds in England, to never bid against each other, so they inform one another of the bid they have made for any article in any house. The hapless householder then finds that the first offer he gets is the highest, and, what is more, he never gets it again Much of the tailoring trade of Bombay is in the hands of the Goanese community. They take apprentices only from among themselves and, if possible, from among those who come from the same village in Portuguese India, from which they themselves hail. Anybody dealing with these tailors is struck by the uniform prices ruling. It does not appear that there is any deliberate agreement, but the Goanese in Bombay meet in clubs (called Kurs, to be hereafter described), and there, no doubt, talk of each other's rates (as English farmers do on the market day about wages and prices), and then it is considered *infra dig.* to charge or to be known to charge less than any other man.

6. A very slight examination of these few examples quoted shows the limits of success of trade-combinations in large Indian towns. Combination is chiefly influential in forcing terms of exchange of prices, *i.e.*, it successfully concerns itself only with the commercial aspect of a trade-union. Even strikes of mill-hands are not unknown. But the combinations only rarely take the shape of permanent associations; for mill-hands some organization was started, the leader of which left it to die when he was accommodated with a snug berth elsewhere. When these combinations are successful, they are chiefly through understandings as of the Bombay Jaripuranavalas or tailors, among members of the same community with an original solidarity and when they are concerned with commodities of services in very urgent demand and which cannot be easily replaced from outside. A strike of the sweepers of Bombay would be most calamitous on these principles, and is, for that very reason, made penal.

7. We are now prepared to see why combinations like Masons' Guilds in Europe do not flourish in such a cosmopolitan town as Bombay. The masons there come from Guzerat, Navar, and the Deccan; each group is hostile to the others, or at least unable to comprehend each other, and therefore suspicious; it is the necessity of life for the later comers to oust the well-established by the bribe of lower wages, and probably the methods of all are equally unintelligent, though different. The Agricoli of Nahim have a very different method of cultivation from the Mahratta Kumbi: one uses human manure and stores water, another holds the first in abhorrence and distrusts canal irrigation. When such hostile groups have to coalesce, they can enforce neither industrial efficiency nor make any resistance against low wages or prices. The strength of resistance is best seen in two cases. The Goanese cook or butler is a very independent chap: he can give his master as bad a character as his master him; he can make it impossible for his master or mistress to get good servants. He is a good servant, so he is tolerated in spite of his habits of drinking and his habit of levying a toll on the purchase of consumables by the house. Indeed, he would be more obstreperous than he is but for Surti and Madrasi substitutes in Bombay. As it is, he gets fits of independence, flirts with the female servants, drinks and makes rows, and sometimes gets fits of laziness when he will quit the best service. He has been, since his arrival in Bombay, a member of a Kur or club where he has regularly paid his subscriptions on the 15th of every month, and has purchased thereby accommodation for his box of clothes and things, which box serves as his free bed when out of service. He won't be on the street when he leaves his master, and he knows it; he has savings, or he can borrow from the club-master of the club itself. So he will leave his service because he can't stand a long discipline of work. The other instance I shall quote is that of the weavers of Surat. For a

long time past a trade in fine silk-work has sprung up between this port and France. A particular design of silk-work done in Surat has caught the fancy of Algiers, as French middlemen make large purchases of this stuff and export it to this colony. The demand is steady, and formerly used to keep hundreds of Parsi weavers busy. The earnings were something like ₹15 per head per month, so that a family could sometimes earn as much as forty rupees. Between the weavers and the French middlemen there was the intermediation of Parsi *entrepreneurs* ; they parcelled out work among the weavers, made advances of money, shipped the silk woven, and undertook all the risks and worries of business. They also supervised the work which was done at their own homes by the weavers. Gradually, the business fell out of the hands of the Parsi workmen. Jellai workmen replaced them until that caste has now the monopoly. But they have no affection for their work. So they have become a nuisance to their Parsi employers. They resent supervision as intrusion into their houses, the grievance of one is made a grievance by all, and every bit of criticism is put down as ill-treatment. New processes, very economical to the employer, are stoutly and successfully resisted without even the enquiry, whether they are likely to diminish the demand for their hand-work. In Surat there are no substitutes for them; the employers have to go as far as Dharwar for them; the weavers of Dharwar would not leave their houses by twos or threes, so work will have to be sent out to Dharwar: and if Dharwar weavers should be found more manageable than the Jellais of Surat, the chief reason must be the rivalry between the mission weavers who are converts and the local Hindu weavers.

8. So far I have been dealing with groups of producers. But there are organizations of pure merchants which by combination exact respect and advantages for their respective bodies. There are the Piece Goods Merchants Associations. I understand that they have broken the combination of Shipping Companies in the matter of freight, and also that they have extorted from the indent offices the concession that in case of arbitration or dispute one of the assessors shall be their own nominee. There is a Grain Dealers' Association which, no doubt, studies the welfare of that business, but whose chief function known to the public appears to be to levy a toll (lago) on the sale of grain, appropriated to the prevention of cruelties to animals. I should study the organization and work of these bodies, if you instruct me to do so.

9. In Ahmedabad, I understand, there are a great many trade-guilds founded on caste. I was to have consulted the Hon'ble Mr. Gokaldas K. Paukh on the subject, but he is one of the three gentlemen I missed seeing. In the mere matter of trade knowledge, the Native Vaids (physicians) are very secretive; there is no definite information as to how these hand down their knowledge. It is, I presume, partly hereditary, partly buried in rare and quaint books, partly derived from Sanyasis or Hakims whose favour one has won from some cause. There are also the Cashmere dyers whose mixture of dyes is kept so secret that they perform the process of mixture at some distance from any habitable area. The real guilds regulating the efficiency of trades are the Universities, High Courts, exacting qualifications for solicitors and pleaders, and insisting on a term of apprenticeship and a fee (₹5,000 in Bombay), and they are successful in regulating independently of caste, because they appeal to educated men over whom the idea of caste has already relaxed its hold. Moreover, the Universities and the High Court have legal authority to exact efficiency and hold the key to the most lucrative professions in the country.

10. I cannot find any organization for co-operative credit and mutual benefit within a trade. It is interesting to remark with regard to co-operative credit what I have been told within this week, that an American Life Insurance Office advances loans to its insurers within 80 per cent. of the premium they have paid. Similarly, the members of a Goanese Kur can borrow from the Reserved Fund of a Kur (club) made up of the admission fee and the savings accumulated. The rate of interest charged is often determined by auction when the application for funds is bigger than the funds can meet. But then a Goanese Kur is not a craft-guild ; it is based on birth in the same village, and though its composition is largely of domestic servants, yet there is always a sprinking of tailors, compositors, writers, etc. The Kur is also a mutual benefit society to this extent, that is, in some cases a residential club also, that it provides board and lodging at fair rates to such working members as care to live in it, and it affords free quarters and cheap board to members out of service. There is at Dhobi Talao a big Kur with 700 members with a bank balance of twelve thousand rupees, which guarantees a funeral costing ₹100 to any member dying on land, and the payment of that amount to families of members dying on sea. The Kur must be thus spending about ₹1,500 a year on its dead members alone.

11. I am not referring to organization and pension schemes of people in Government or Telegraph or Railway services.

APPENDIX VII.

Prospectus of the Industrial Missions Aid Society.

The Industrial Missions Aid Society has been formed for the purpose of assisting the work of foreign missions by the establishment of industries to be carried on in close connection with ordinary Missionary operations, but financially separate.

Many advantages would be gained by such a combination of spiritual and industrial work, but the main objects the Industrial Missions Aid Society has in view are the following:—

(1) To assist as many as possible of the 30,000 famine orphans brought up in Mission schools by finding them industrial employment when they have to leave the protection of the Mission and would otherwise have to be sent adrift into the world, and by helping other Native Christians in a similar manner.

(2) To increase the funds available for missionary purposes. The industries will be commenced and worked with a view to their ultimately becoming not only self-supporting, but a source of income for the development of missionary enterprise.

There is much capital in the hands of Christian people which might be devoted to this purpose, and it may be reasonably inferred that Christian people having money to invest will readily and gladly support industrial missionary work, provided they are convinced that it may be wisely undertaken.

The Industrial Missions Aid Society is entirely undenominational.

The work of the Society will be conducted on sound business principles, and each proposal or scheme, whether for initiating new industries or for helping those already in existence, will be most carefully considered on its merits, and each one must show, first, that it is of distinct missionary value, and, second, a reasonable prospect of being self-supporting.

The Industrial Missions Aid Society advocates among all classes of Native Christians the dignity, the discipline, and the necessity of self-help, and the close relationship existing between honest toil and Christian character.

In order to assist them in this direction, the Industrial Missions Aid Society is desirous of establishing more industries in various parts of India, and, until these concerns become self-supporting, the Society appeals to the generosity of all those who have this cause of humanity to heart, first, to assist them by donation, and, second, by the investment of money as capital in these industries, which are expected to be safe investments for capital and to pay reasonable returns, while at the same time being very useful from the missionary point of view.

Further information may be had from, and remittances may be paid to,

The Secretary,
Industrial Missions Aid Society,
63, Apollo Street, Fort, Bombay.

Constitution.

The Society is registered under the non-profit clauses of the Companies' Acts. Its constitution expressly provides that the income and property of the Association, whencesoever derived, shall, after payment of working expenses and interest to investors, be applied solely towards the promotion of its objects, as set forth in the Memorandum of Association. This precludes any member of the Society from benefiting financially from its operations.

APPENDIX VIII.

Note on Markets, by the President.

There is no use in providing workmen in excess of market requirements. But it is tolerably certain that many products, particularly those in which hand work or art occupies a place, would command a much greater sale than is now the case if the work was more uniform in quality and better known to the public.

It may generally be accepted that there is no great sale in India for art wares, and that, if an extensive demand is to be looked for, the European and American markets must be reached. A great deal might doubtless be done if the higher classes in India could be induced to give the same recognition and support to the manufactures of their country that their forefathers did, but the fashion has set in strongly for European styles, and it is not easy to suggest how it can now be reversed.

If the European and American markets are to be captured, it must be by agency and advertisement. With controlling officers well acquainted with the possibilities of Indian production, with selected craftsmen in the trades, it should not be too difficult to manage what is being done every day by business men who have few of these advantages. The Imperial officer should first select agents in suitable cities, next send them sets of samples and fix terms; he should then put the producer in communication with the Agent, making it clear to the craftsmen that their future success depended on the prompt supply of goods on order equal to sample and of uniform quality. It would be very advantageous if it could be managed to have such goods passed by an expert and marked by him as a proof of quality. As soon as the trade was fairly started, it should be advertised until firmly established.

I believe that assistance given in this direction would be more effective than the exhibition of articles of superior excellence in museums, although this means of advertising should not be overlooked.

J. CLIBBORN.

APPENDIX IX.

Statement showing the various Trades taught in existing industrial schools, with the number of schools in which each trade is taught.

1	Carpentry	83
	Blacksmith's work	44
	Tailor's work	21
	Weaving	13
5	Shoe-making	13
	Metal work	8
	Cane work	8
	Carpet-weaving	6
	Art metal work	6
10	Wood-carving and Inlay	6
	Cabinet-making	6
	Painting and Varnishing	5
	Turning	5
	Printing	5
15	Pottery manufacture	4
	Book-binding	4
	Embroidery	4
	Mason's work	4
	Fitter's work	2
20	Mechanical Engineering	2
	Lace-making	2
	Rope and basket-making	2
	Tinsmith's work	2
	Spinning	2
25	Moulding	1
	Polishing	1
	Cotton manufacture	1
	Iron enamel ware manufacture	1
	Locomotive driving	1
30	Silversmith's work	1
	Jeweller's work	1
	Engraving	1
	Modelling	1
	Tape-making	1
35	Hosiery making	1
	Watch-making	1
	Photography and photo-mechanical process	1
	Stone-carving	1
	Candle-making	1
40	Locksmith's work	1
	Bidri work	1
	Sericulture	1
	Agriculture	13
	Gardening	14
45	Domestic service	2
	Dairy work	1
	Tambour	1
48	Tat-patti making	1

APPENDIX X.

Reprint of the Chapter on "Drawing" in the "Report on Practical and Technical Education," by Sir E. C. Buck, Kt., K.C.S.I.

The various branches of drawing.

48. Instruction in drawing is, independently of its educational value in developing the faculties, most important as a preparation for technical education and industrial callings. This is well understood in all provinces. But progress is everywhere represented to be slow because of the difficulty of obtaining drawing masters and of training teachers. A great deal of this difficulty can be cleared away if the fact be appreciated that there is more then one branch of drawing, and that the one most important for educational purposes, especially in primary and rural schools, is geometrical drawing. The various branches of drawing are defined in the following paragraph taken from the Irish Report:—

"We find considerable confusion existing as to terms used to denote different branches of Drawing taught in elementary schools. We, therefore, define the meaning in which we propose to use certain terms.

"*Freehand Drawing.*—This term we apply to the reproduction on the same or different scales without mechanical aid, of examples which have been already drawn on the flat.

"*Mechanical Drawing.*—This term we apply to drawings produced by the aid of instruments, whether copies of drawings, plans to scale, conventional representation of solid forms, or the construction of geometrical figures, a form of drawing often included under the term 'Geometrical Drawing.'

"*Model Drawing.*—This term we apply to the pictorial representation of solid forms without mechanical aid.

"*Brushwork.*—A modification of freehand drawing in which the brush and colour replace the pencil.

"*Colourwork.*—A system of drawing in which masses are represented by tints of colour.

"*Drawing in light and shade.*—The representation in monochrome of casts or objects with light and shadows properly depicted." (*Part II, Section III, Final Report of Irish Commissioners.*)

Instruction in geometrical drawing to be given in schools.

49. Professor Huxley, in urging the introduction of drawing into all schools, said, "By this I do not mean freehand and artistic drawing, but the drawing of geometrical figures and plans." The Principal of the Lahore School of Arts assured me that it would take the same number of months to train a teacher to instruct in this class of drawing, as it would take years to train efficiently a master in freehand and artistic drawing. The Irish Commissioners remark that—

"Mechanical (*i.e.*, Geometrical) drawing is eminently utilitarian, and does not demand from teacher or pupil any skill in the unaided use of a pencil, that cannot be easily acquired. It may, however, be made the means of much useful training and mental discipline. The copying of rectilinear figures by means of the ruler and pencil, but without resorting to measurement, except as a check when the work is completed, is a useful exercise for young children in accurate observation and judgment of relative distances.

"Practice in the construction of geometrical figures is both a mental exercise requiring thought and reasoning, and a training that lays up a store of knowledge that will be frequently useful in after life, and if confined to the more elementary figures is quite within the scope of primary education."

* * * * * * * * *

"A power to impart instruction in this branch, within the limits we have indicated, should not be beyond attainment by every teacher." (*Part II, Section III, Final Report of Irish Commissioners.*)

"In German primary schools drawing is taught almost entirely from the flat: in the highest classes the boys draw also from objects." (*Page 169, Appendix B, Irish Commissioners' Report.*)

"In Switzerland 'drawing starts with geometry.' (*Page 201.*)

"In France 'the making of geometrical figures and their measurement is in geometrical drawing the chief work done in the average school." (*Page 218.*)

Instruction in freehand drawing unnecessary.

50. The present system throughout India is to teach freehand drawing of a somewhat high standard. Local Governments may perhaps be advised that except in the higher schools this seems to be unnecessary, and may be asked to consider the view which I have brought forward.

Proposed arrangements for rapid progress.

51. Many students now come to industrial schools only in order to get a free education in artistic drawing. "In the School of Arts at Madras," writes Mr. Chatterton, "the majority are only learning a trade in order to get free instruction in drawing, and have no intention whatever of following the trade. The drawing instruction should be limited to the actual requirements of the artisan." The same tale was told at other Art Schools, the main object of the students being to obtain employment as drawing masters and draftsmen. The Educational Department should, in my opinion, prepare a forecast (*a*) of the number of teachers who will be required as special drawing masters in the higher schools (including training schools), and (*b*) of the number of schoolmasters required to instruct in geometrical drawing only, without the aid of a drawing master, in the lower schools, and should then make suitable arrangements which would secure in a legitimate way the rapid progress so much desired, and at the same time put an end to the roundabout method by which, at much waste of time and of State money, many teachers now get themselves trained.

Utilization of patwaris and kanungos to train village schoolmasters in geometrical drawing.

52. In the Central Provinces the Local Government proposes to utilize patwaris and kanungos to train the village schoolmasters in simple geometrical drawing and map making, for, the main object in teaching drawing to country school boys (independently of the indirect object of training 'hand and eye') being to secure an intelligent knowledge of the village map, it is unnecessary that the rural schoolmaster should be required to have any further

acquaintance with drawing than that possessed by the ordinary village officer.[1] Whether this plan, which seems to have merits, can be adopted in other provinces or not, it is, at any rate, clear that the elaborate teaching which present systems contemplate can for the purposes of primary schools be replaced by much more economical and speedy methods.

[1] Colonel Barron, the best 'trainer of patwaris' in the Survey Department, recorded in his excellent manual of cadastral survey that he could teach any boy of 15 to survey a village in a month. It would, therefore, probably suffice if the patwaris and kanungos could give instruction for a fortnight each year in the slack season.

G. I. C. P. O.—No. 1365 H. D.—2-7-1903—14.—J. E. F

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REPORT

ON

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